Environment Canada
Canadian Wildlife Service

Environnement Canada
Service canadien de la faune

The importance of wildlife to Canadians in 1987:

The economic significance of wildlife-related recreational activities

Prepared by

Federal–Provincial Task Force
for the 1987 National Survey
on the Importance of Wildlife
to Canadians

Members

Fern L. Filion (Chairman)
Canadian Wildlife Service

André Jacquemot
Canadian Wildlife Service

Peter Boxall
Alberta Forestry, Lands and
Wildlife

Roger Reid
British Columbia Ministry of
Environment

Pierre Bouchard
Ministère du Loisir, de la
Chasse et de la Pêche du
Québec

Elaine DuWors
Canadian Wildlife Service

Paul A. Gray
Ontario Ministry of Natural
Resources

A member of the Conservation and Protection family

91-03723/

Published by Authority of the
Minister of Environment
Canadian Wildlife Service
© Minister of Supply and Services Canada 1990
Catalogue No. CW 66-103/2-1990E
ISBN 0-662-18078-X

Design: Ove Design Group

Canadian Cataloguing in Publication Data

Federal-Provincial Task Force for the 1987 National Survey on the Importance of Wildlife to Canadians

The importance of wildlife to Canadians in 1987: the economic significance of wildlife-related recreational activities

ISBN 0-662-18078-X
DSS cat. no. CW66-103/2-1990E

1. Wildlife conservation — Economic aspects — Canada. 2. Wilderness areas — Canada — Recreational use — Economic aspects. 3. Public opinion — Canada. 4. Wildlife conservation — Canada — Public opinion. 5. Economic surveys — Canada. I. Canadian Wildlife Service. II. Title. III. Title: The economic significance of wildlife-related recreational activities.

QL84.24F42 1990 333.95'0971 C90-098710-3

Executive summary

This report examines the economic significance of activities that depend on wildlife by addressing two complementary questions:

(1) "What are the economic impacts that result from participation in wildlife-related activities?"

(2) "How much value do people place on wildlife-related activities?"

These questions are important within the context of a "sustainable development" philosophy. In this context, sustainable development implies the utilization of wildlife and the ecosystems on which wildlife depends to optimize economic and societal benefits today while not damaging prospects for their use by future generations.

With respect to the first question, findings from a major national survey reveal that wildlife resources provide a range of significant economic impacts, including contributions of $6.5 billion to Canada's gross domestic product and $3.7 billion in personal income generated by the jobs sustained by this economic activity. The answer to the second question reveals that the net economic value attributed by participants to wildlife-related activities approaches $1 billion. By considering wildlife resources as renewable assets capable of providing annual returns of $1 billion in perpetuity, the present value of these future benefits is estimated to be considerably higher. More specifically, if management programs were to fail in their objective to perpetuate wildlife resources for sustainable utilization by future generations, the loss in benefits would range from $10 billion to $20 billion. When these findings are combined with similar results obtained for recreational fishing, the above-mentioned economic benefits double in magnitude, confirming that renewable resources such as fish and wildlife are highly valuable to the nation.

The significance of these direct and indirect benefits in 1987 is understandable given the fact that over 18 million Canadians spent more than a billion days taking part in such wildlife-related activities as hunting, making special trips to observe and photograph wildlife, and enjoying wildlife around their homes or cottages. These and other economic indicators are presented for Canada and the 10 provinces, which co-sponsored this comprehensive study. The survey was conducted by Statistics Canada based on a representative sample of 80 000 Canadian adults.

The socio-economic results constitute highly defensible estimates of the benefits of fish and wildlife to Canadians. They provide a significant incentive to ensure that biological diversity is conserved so that these benefits continue to accrue in perpetuity to people in accordance with sustainable development policies and programs that are emerging throughout federal and provincial jurisdictions.

Preface

In 1987, a nation-wide survey on The Importance of Wildlife to Canadians was carried out by Statistics Canada under the sponsorship of the Federal–Provincial Wildlife Conference and the direction of the Canadian Wildlife Service. The results of the survey of 80 000 Canadians aged 15 years and over, in the 10 provinces, demonstrate the considerable importance people attach to wildlife and the notable role that this renewable resource plays in the country's economy. These findings have significant implications for managers involved in the protection of wildlife and its habitat, the development of resource policies, program planning, and the evaluation of current wildlife programs and services in the context of a "sustainable development" framework.

The survey was designed to update a similar national survey conducted in 1981. Together, the 1981 and 1987 survey results provide strategic socio-economic insights on trends in wildlife utilization. The findings are especially relevant for senior decision makers who are accountable for a wide range of wildlife and habitat management programs conducted at international, federal, and provincial levels.

This project represents the combined efforts and expertise of conservation agencies in the federal and provincial governments. Such an undertaking would not have been possible without the unique co-operative efforts of the agencies involved, enabling the gathering of information useful to the sponsors and other concerned researchers and managers. However, the ultimate beneficiaries of the study will be the wildlife and people of Canada.

This report is the third in a series under the generic title *The importance of wildlife to Canadians in 1987*. For information on the general background of the survey and an overview of its key findings, the reader should consult the report entitled *Highlights of a national survey* (1989). For information on survey design, questionnaire content, and the statistical precision of the results, the reader should consult the report entitled *A user's guide to the methodology of a national survey* (1990). Copies of these publications on the 1987 results and of five earlier reports on the 1981 survey findings may be obtained from the authors of this report, from the Canadian Wildlife Service, or from provincial government wildlife agencies.

Acknowledgements

A number of people have been instrumental in the successful completion of this report. We would like to thank the following persons: K. Brickley (Fisheries and Oceans Canada), R. Algie, M. Bédard, R. Durand (Statistics Canada), Patricia Logan, Gilles Bertrand, Agathe Ledoux (Environment Canada), Alison Coyne (Alberta Forestry, Lands and Wildlife), and Marla Sheffer.

Table of contents

1	Introduction	7
2	What is meant by "economic significance"	8
3	Indirect benefits: Contributions to Canada's economy	9
4	Direct benefits: Value to participating Canadians	10
5	Economic benefits of wildlife-related recreational activities for residents of Newfoundland in 1987	12
6	Economic benefits of wildlife-related recreational activities for residents of Prince Edward Island in 1987	14
7	Economic benefits of wildlife-related recreational activities for residents of Nova Scotia in 1987	16
8	Economic benefits of wildlife-related recreational activities for residents of New Brunswick in 1987	18
9	Economic benefits of wildlife-related recreational activities for residents of Quebec in 1987	20
10	Economic benefits of wildlife-related recreational activities for residents of Ontario in 1987	22
11	Economic benefits of wildlife-related recreational activities for residents of Manitoba in 1987	24
12	Economic benefits of wildlife-related recreational activities for residents of Saskatchewan in 1987	26
13	Economic benefits of wildlife-related recreational activities for residents of Alberta in 1987	28
14	Economic benefits of wildlife-related recreational activities for residents of British Columbia in 1987	30
15	Selected comparisons with 1981 results	32
16	Economic benefits of fish- and wildlife-related recreational activities	34
17	Implications and conclusions	35
Appendix A: Definition of terms		37
Federal and provincial survey sponsors		40

1 Introduction

Canada, with its immense land mass of 10 million square kilometres, is characterized by a diverse array of ecosystems. Within these important ecosystems are found over 200 species of mammals, 400 species of birds, 80 species of reptiles and amphibians, 25 000 species of invertebrates, and 8000 species of plants, among other forms of biological diversity.

For centuries, people have depended on Canada's renewable and non-renewable resources for their continued well-being. But, in the last decade, it has become increasingly apparent that renewable resources are precious assets to be conserved for the benefit of all humanity. This is the central philosophy underlying the notion of "**sustainable development**."[1] In the context of this study, **sustainable development implies the utilization of wildlife and the ecosystems on which wildlife depends to optimize economic and other societal benefits today while not damaging prospects for their use by future generations.**[2] Imbedded in the concept of sustainable development is the notion that **wildlife** resources and our economy are closely interconnected—perhaps more than one might have imagined.

Wildlife resources are highly valuable to Canadians and to their economy. The purpose of this report is to provide answers to two fundamental questions. One question is concerned with how much value people place on **wildlife-related activities**. The other question concerns the economic activity generated by the use of wildlife resources.

The report addresses these socio-economic questions in the chapters that follow. Chapter 2 introduces a number of key concepts used in determining the economic significance of wildlife. Chapter 3 examines the diversity of economic impacts resulting from the recreational utilization of the wildlife resource in Canada. Chapter 4 reveals the magnitude of the value of wildlife-related activities for Canadians participating in these activities. Chapters 5 to 14 provide executive overviews of the findings for each of the 10 provinces, which co-sponsored this federal–provincial initiative. Chapter 15 compares selected economic findings from 1987 with those derived from a national survey conducted in 1981. Chapter 16 demonstrates the significance of a wider range of wildlife resources than has been readily available previously by presenting key economic indicators for both fish- and wildlife-related recreational activities. The final chapter, Implications and conclusions, discusses the strategic role of these socio-economic findings and the incentive these findings provide for fresh investments in conservation.

[1] Key terms that appear in black boldface type in the text the first time they are mentioned are explained more fully in Appendix A.

[2] This definition is consistent with the concept elaborated by the United Nations World Commission on Environment and Development (Brundtland Commission) in 1987 (Our common future, Oxford, England) and endorsed by Canada's National Task Force on Environment and the Economy in 1987 (Report to the Canadian Council of Resource and Environment Ministers, Downsview, Canada).

2 What is meant by "economic significance"

In 1987, more than 18 million Canadians spent in excess of one billion days taking part in wildlife-related recreational activities. These wildlife-related activities generated both **direct** and **indirect benefits**. While both types of benefits are important in explaining the "economic significance" of wildlife in Canada, each is intended to answer a different but complementary question.

Direct benefits are economic values that people place on the utilization of a resource. In this study, indicators of direct benefits were obtained in response to the question, "How much value do people place on wildlife-related activities?"

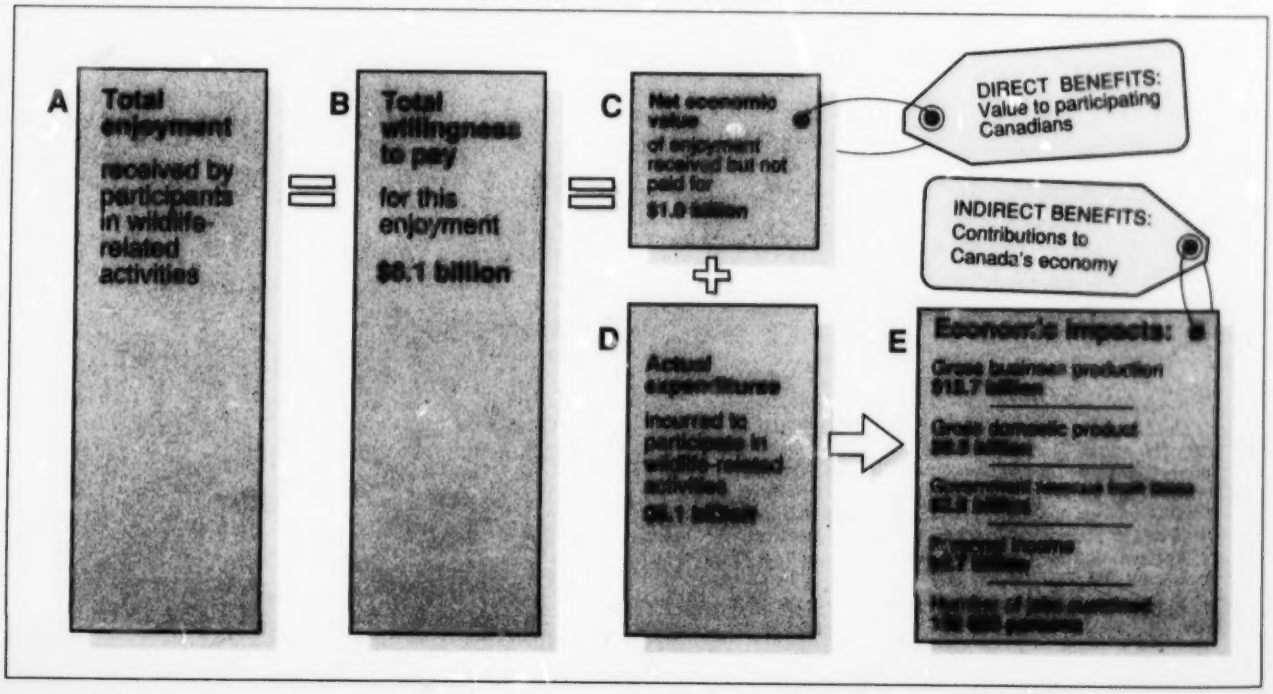
Indirect benefits are indicators of the economic activity generated by the use of a resource. In this study, indicators of indirect benefits were obtained in response to the question, "What are the economic impacts that result from participation in wildlife-related activities?"

These two distinct types of benefits are illustrated in Figure 2.1. The vast majority of those who engage in wildlife-related recreational activities derive considerable enjoyment from their participation (A). For hunters, it could be the challenge and excitement of stalking game; for bird-watchers, it could be the satisfaction of spotting their first robin in the spring or of finding a species new to them. In order to experience these kinds of interactions with wildlife, Canadians are prepared to pay for the enjoyment they receive from wildlife. In fact, those who took part in wildlife-related activities in 1987 indicated that they would be willing to pay in excess of $6 billion (B).

This **total willingness to pay** for the enjoyment provided by wildlife every year is composed of two distinct components: the actual **expenditures** incurred to participate in wildlife-related activities (D), and an additional amount, a **net economic value**, for the enjoyment received but not paid for (C). This net economic value is a reflection of the importance that participants attach to wildlife-related activities, and it is comparable with the economic values of other goods and services that people depend on to meet their needs. Further insights on the concept of net economic value are provided in Section 4.1.

For the 12-month period of 1987, expenditures made by participants on wildlife-related activities amounted to $5.1 billion. The same participants also reported that they would be willing to pay an additional $1.0 billion for the enjoyment that they received from wildlife during the year. This is an indication of the magnitude of the net economic value (direct benefits) of wildlife-related activities across Canada. The expenditures of participants led to important economic impacts (indirect benefits) at national and provincial levels (E). These important ripple effects on the economy can be measured through contributions to the country's **gross domestic product (GDP)** and to employment, among others. Further insights on indirect benefits are given in Section 3.2.

Figure 2.1
Direct and indirect benefits resulting from the enjoyment of wildlife in Canada in 1987



3 Indirect benefits: Contributions to Canada's economy

Indirect benefits consist of impacts on the economy that result from the expenditures made by participants on wildlife-related activities (see Fig. 2.1, D and E). Measuring the economic impacts of these activities on the national and provincial economies for 1987 involved several steps, beginning with the collection of vital information on expenditures by participants.

3.1 Expenditures on wildlife-related activities

Data on expenditures were obtained using a comprehensive national survey of 80 000 Canadians, conducted by Statistics Canada. The questionnaire was designed so that expenditures over the 12-month period of 1987 would be reported only if they were incurred *primarily* for wildlife-related recreational activities. The expenditure-related questions covered seven categories, including accommodation, transportation, food, and equipment.

Residents of Canada spent $5.1 billion on wildlife-related activities during 1987. The distribution of this sum for hunting (a **consumptive activity**) and **non-consumptive activities** across seven expenditure categories is shown in Table 3.1. Of the total expenditures, approximately $1 billion, or one-fifth, was spent on hunting. The rest, about $4 billion, was spent on non-consumptive activities and other activities, such as contributions to wildlife organizations and maintaining, improving, or purchasing **natural areas** that provide a habitat for wildlife. Equipment and natural area preservation accounted for half (50.6%) of all money spent. These expenditures led to the significant economic impacts described in Section 3.2.

3.2 Impacts of expenditures on the economy

Expenditures on wildlife-related activities (Fig. 3.1) have important impacts at local, provincial, and national levels of the Canadian economy. These impacts are expressed in terms of such indicators as contributions to the gross domestic product (GDP), **personal income**, **number of jobs** sustained, and **government revenues from taxes**.

Total economic impacts for Canada exceed the initial expenditures because of the cumulative ripple effects of three different types of impacts. To illustrate how these three types of impacts occur, one can consider the example of equipment purchased either to hunt or to observe wildlife. For the first type of impact, the purchased equipment supports employment and income in the retail sector of the economy. For the second type, impacts occur with the purchase by manufacturers of steel, leather, wood, glass, and other materials, as well as financial, transportation, and other services. Further impacts might include the purchase of primary resources, such as iron ore and coal, by the manufacturing industries. For the third type of impact, the incomes earned by those employed in these industries are partially spent on goods and services,

Figure 3.1
Expenditures by participants in wildlife-related activities in Canada in 1987 and resulting economic impacts

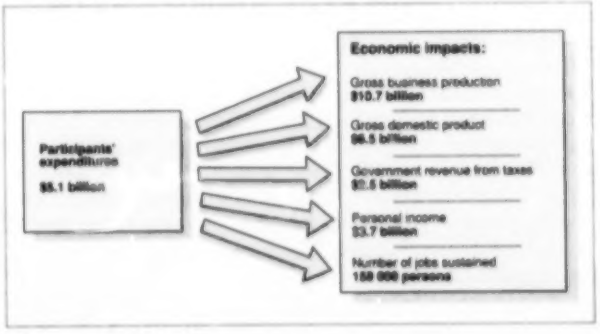


Table 3.1
Distribution of wildlife-related expenditures for Canada in 1987*

Category of expenditure	Recreational hunting (%)	Non-consumptive and other activities (%)	All wildlife-related recreational activities (%)
Accommodation	5.6	6.3	6.1
Transportation	25.4	15.0	17.2
Food	12.8	8.6	9.5
Equipment	39.6	21.6	25.3
Other items	16.7	14.7	15.1
Natural area preservation	—	32.0	25.3
Wildlife organizations	—	1.8	1.4
	100.0	100.0	100.0
Total ($)	1060.3 million	4038.9 million	5099.2 million

* Some figures may not total perfectly because of rounding.

which induces further employment and income impacts throughout the economy.

The latest **input-output models** available from Statistics Canada were used to compute these impacts at various stages in the production of goods and services. In the process, National Survey data from the seven expenditure categories totalling $5.1 billion were allocated to 46 of the 595 commodities represented in the input-output models in accordance with the pattern of consumption expenditures by Canadians in 1987.

The economic impacts of wildlife-related expenditures in 1987 are shown in Figure 3.1. The first indicator, **gross business production**, is a measure of overall business activity within Canada. Almost $11 billion of business production at the intermediate and final stages was generated as a result of wildlife-related activities. In other words, for every dollar spent on wildlife-related activities, more than two dollars of gross business production was generated. The next indicator, gross domestic product (GDP), is one of the most widely quoted measures of economic performance. Wildlife-related expenditures contributed $6.5 billion to Canada's GDP. Some 159 000 jobs were supported as a result of participation in wildlife-related activities. These jobs provided $3.7 billion in personal income. As a result of taxes on various goods and services and on personal and business incomes, $2.5 billion in revenue was received by federal, provincial, and local governments. Based on the distribution of expenditures in Table 3.1, approximately one-fifth of all economic impacts can be attributed to hunting.

4 Direct benefits: Value to participating Canadians

We have seen that wildlife-related recreational activities provide significant indirect benefits to Canada's economy, but how important are they as a source of direct benefits to people? In other words, "How much value did people place on wildlife-related activities in 1987?" This question is addressed in Section 4.1 below.

Because wildlife is a renewable resource that can be expected to provide benefits year after year, there is an important related question on the **present value** of the future benefits that will result from well-managed wildlife populations today. More specifically, if we assume that wildlife management programs from 1987 onwards will be successful in conserving wildlife populations and habitat, then "What is the present value of the benefits from wildlife-related activities that are expected to occur year after year in the future?" To put it another way: "What is the present value of wildlife-related activities that may be lost if management programs are not successful in perpetuating this living resource for the sustainable use and enjoyment by future generations?" The answer to these questions is provided in Section 4.2.

4.1 Net economic value of wildlife-related activities

Measuring the net economic value of wildlife-related activities presents a formidable challenge. On one hand, wildlife is a common property resource—it belongs to all Canadians. On the other hand, most wildlife-related activities are organized by the participants themselves, who generally do not have to pay a market price for these activities. Hence, there is little or no information readily available on the economic value of these "do-it-yourself" recreational experiences. For these reasons, participants in the 1987 Statistics Canada survey were asked about their willingness to pay for wildlife-related recreation so that an economic value could be derived—an economic value that is comparable with that of goods and services readily available in the marketplace to meet human needs. The resulting dollar amounts for wildlife reflect direct benefits that occur outside the marketplace. These benefits were evaluated by first asking participants how much they actually spent on wildlife-related activities (see Fig. 2.1, D, and Section 3.1). Next, in order to estimate the net economic value of wildlife-related activities, participants were asked to report the amount by which their participation costs in 1987 would have had to increase to make them decide not to participate in those activities that year (see Fig. 2.1, C).

Table 4.1 reveals that residents of Canada derived significant net economic value from wildlife-related recreation during 1987. This direct benefit was valued at nearly $1 billion. The table shows total and average net economic values for hunting and **primary non-consumptive trips**. Those engaging in primary non-consumptive trips received 54% of the total value provided by wildlife-related recreation, whereas the remaining 46% accrued to participants in hunting trips. Almost half of the value of hunting was attributable to the hunting of large mammals. On a per capita basis, hunters attached average yearly and daily values that were more than twice as high as those of participants in non-hunting trips. Based on these averages, those who hunted large mammals and waterfowl derived a higher average yearly value than participants in any other wildlife-related activity studied.

4.2 Present value of expected benefits from wildlife in future years

In the context of sustainable development, effective wildlife management is expected to ensure the perpetuation of wildlife populations and to allow a sustained yield of benefits to Canadians year after year. If we assume that wildlife-related benefits resulting from adequate conservation measures today will

Table 4.1
Distribution of net economic values by wildlife-related activity for Canada in 1987*

Wildlife-related activity	Average value per participant ($)		Annual value for all participants ($)	% distribution
	Daily	Yearly		
Hunting				
• Large mammals	17.0	200.9	208.9 million	21.2
• Small mammals	7.7	92.6	68.0 million	6.9
• Waterfowl	15.6	167.2	83.1 million	8.4
• Other birds	10.1	106.8	91.7 million	9.3
All hunting	15.8†	268.3†	451.7 million	45.8
Primary non-consumptive trips	7.2	121.7	535.6 million	54.2
Total	—	—	987.4 million	100.0

* Some figures may not total perfectly because of rounding.
† Average may seem high because many participants hunt more than one type of wildlife during the season.

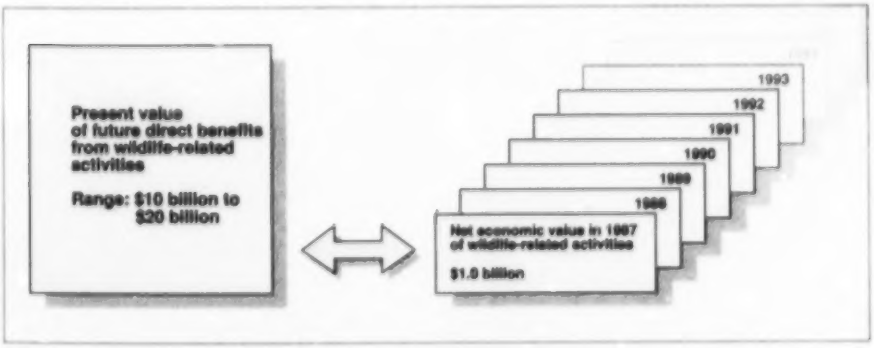
continue to accrue in perpetuity, then it is appropriate to ask, "What is the present value of expected direct benefits for generations to come?" It is possible to quantify the magnitude of this sustained yield of direct benefits in perpetuity by "capitalizing" the $1 billion of benefits observed during the 12-month period of 1987 (Fig. 4.1).

In order to explain what is meant by **capitalized value**, one could compare wildlife resources with an interest-earning asset such as an **annuity**. **The capitalized value, or present value of the annuity, is the total amount of money that would have to be invested today at a fixed interest rate to earn an annual return equal to the value of the benefits from this asset. When applied to wildlife resources, this means that the capitalized or present value of these renewable assets is the total amount of money that would have to be invested today to earn, in future years, an annual return equal to the net economic value of wildlife-related activities as measured for 1987.**

Crucial to this calculation is the choice of an appropriate interest rate—usually referred to as a **discount rate**. Higher rates favour current use of an asset, whereas lower rates favour sustaining the yield into the future. Because wildlife resources are a common property resource managed in trust by government, and because the vast majority of Canadians attach considerable importance to maintaining wildlife populations for use by future generations, a relatively low discount rate is advised. Two discount rates have been used here (5% and 10%) in order to demonstrate the sensitivity of the resulting capitalized value. Hence, the resulting calculations show upper and lower bounds for a range of present values. They are "real" discount rates inasmuch as they are over and above the rate of inflation.

Upper and lower bounds of the present value of the future stream of recreational benefits supported by Canada's wildlife are shown in Figure 4.1. The results indicate that $10 billion of capital would have to be invested today at an interest rate of 10% in order to provide an annual return equal to the $1 billion in benefits resulting from wildlife-related recreational activities during 1987. At a discount rate of 5%, the present value would be twice as high, at $20 billion. Based on the distribution in Table 4.1, over half (54%) of this present value would be attributable to participants in primary non-consumptive trips.

Figure 4.1
Present value of future direct benefits from wildlife-related activities in Canada estimated from net economic value of such activities in 1987



5 Economic benefits of wildlife-related recreational activities for residents of Newfoundland in 1987

In 1987, considerable economic benefits resulted from wildlife-related recreational activities in Newfoundland. Money spent by those who engaged in wildlife-related activities generated significant economic impacts, which are described in Section 5.1. Participants in wildlife-related activities also derived a net economic value above and beyond the money they spent to take part in them. This net economic value is described in Section 5.2.

5.1 Indirect benefits to Newfoundland's economy

5.1.1 Expenditures on wildlife-related activities

Residents of Newfoundland spent almost $81 million on wildlife-related activities during 1987. The distribution of this sum by activity and expenditure category is shown in Table 5.1. Of this total, approximately $42 million, or more than half, was spent on hunting, whereas $39 million was spent on non-hunting activities, wildlife organizations, and natural area preservation. These expenditures led to indirect benefits for the economy of Newfoundland, as described in Section 5.1.2.

5.1.2 Impacts of expenditures on the economy

"What are the economic impacts that result from participation in wildlife-related activities by residents of Newfoundland?" The impacts of the $80.9 million spent by Newfoundland residents are shown in Figure 5.1. They were estimated using the most advanced Statistics Canada Interprovincial Input–Output Model and according to procedures described in Section 3.2. Wildlife expenditures contributed $44.0 million to the provincial gross domestic product and supported 1243 jobs. Local and provincial levels of government received more than $8 million in revenue from diverse taxes. Based on the distribution of expenditures in Table 5.1, approximately half of all economic impacts can be attributed to participants in hunting.

Figure 5.1
Expenditures by participants in wildlife-related activities in Newfoundland in 1987 and resulting economic impacts

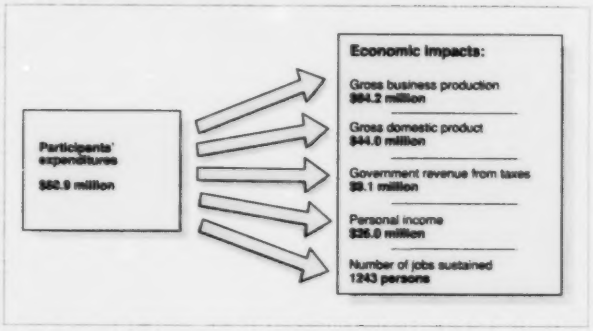


Table 5.1
Distribution of wildlife-related expenditures for Newfoundland in 1987*

Category of expenditure	Recreational hunting (%)	Non-consumptive and other activities (%)	All wildlife-related recreational activities (%)
Accommodation	3.1	6.0	4.5
Transportation	27.4	23.3	25.4
Food	13.9	12.3	13.1
Equipment	40.9	40.6	40.7
Other items	14.7	14.0	14.4
Wildlife organizations and natural area preservation	—	3.8	1.8
	100.0	100.0	100.0
Total ($)	41.9 million	39.0 million	80.9 million

* Some figures may not total perfectly because of rounding.

5.2 Direct benefits received by participants in wildlife-related activities

5.2.1 Net economic value of wildlife-related activities

"How much value do residents of Newfoundland place on wildlife-related activities?" Residents of Newfoundland derived significant net economic value from their participation in wildlife-related recreation during 1987 (Table 5.2). This value is estimated according to procedures described in Section 4.1. The enjoyment is worth an estimated $28.3 million, because participants stated that they would be willing to increase their expenditures by this amount before deciding to forego these activities. Table 5.2 shows the total and average net economic values for different types of activities.

Participants in primary non-consumptive trips received almost 27% of the total net economic value, whereas the remaining 73% accrued to hunters. Almost two-thirds of the total net economic value of hunting was attributable to the hunting of **large** and **small mammals**. Those who hunted large mammals and **waterfowl** derived a higher average yearly value than those participating in other types of activities. Per capita, the average yearly and daily values of hunting trips were more than twice those of non-hunting trips.

5.2.2 Present value of expected benefits from wildlife in future years

Because wildlife is a renewable resource managed by the government in trust, management activities should strive to maintain the direct benefits the resource provides to residents of Newfoundland (Fig. 5.2) year after year in perpetuity. If we assume that wildlife management programs from 1987 onwards will be successful in conserving wildlife populations for sustained utilization, then "What is the present value of the benefits from wildlife-related activities that are expected to occur year after year in the future?"

The question can be answered by estimating the present value of future wildlife-related recreation by residents of Newfoundland. This present value is shown in Figure 5.2 and is based on procedures and assumptions described in Section 4.2. Upper and lower bounds for the present value were computed using discount rates of 5% and 10%. A lower bound for the present value of $283 million was calculated using a discount rate of 10%. Based on a discount rate of 5%, this value would have an upper bound equivalent to $566 million.

Figure 5.2
Present value of future direct benefits from wildlife-related activities in Newfoundland estimated from net economic value of such activities in 1987

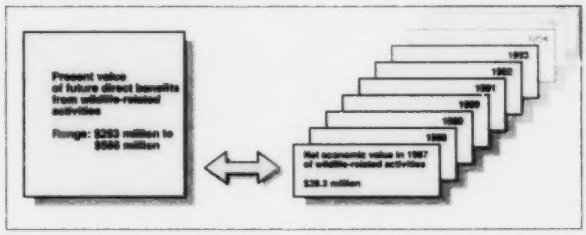


Table 5.2
Distribution of net economic values by wildlife-related activity for Newfoundland in 1987*

Wildlife-related activity	Average value per participant ($) Daily	Yearly	Annual value for all participants ($)	% distribution
Hunting				
• Large mammals	20.4	204.0	7.0 million	24.9
• Small mammals	7.6	136.1	6.2 million	21.8
• Waterfowl	10.9	167.5	4.7 million	16.6
• Other birds	9.3	142.6	2.9 million	10.2
All hunting	13.0†	282.4†	20.8 million	73.5
Primary non-consumptive trips	6.3	104.8	7.5 million	26.5
Total	—	—	28.3 million	100.0

* Some figures may not total perfectly because of rounding.
† Average may seem high because many participants hunt more than one type of wildlife during the season.

6 Economic benefits of wildlife-related recreational activities for residents of Prince Edward Island in 1987

In 1987, considerable economic benefits resulted from wildlife-related recreational activities in Prince Edward Island. Money spent by those who engaged in wildlife-related activities generated significant economic impacts, which are described in Section 6.1. Participants in wildlife-related activities also derived a net economic value above and beyond the money they spent to take part in them. This net economic value is described in Section 6.2.

6.1 Indirect benefits to Prince Edward Island's economy

6.1.1 Expenditures on wildlife-related activities

Residents of Prince Edward Island spent over $19 million on wildlife-related activities during 1987. The distribution of this sum by activity and expenditure category is shown in Table 6.1. Of this total, more than $4 million, or 22%, was spent on hunting, whereas more than $15 million was spent on non-hunting activities, wildlife organizations, and natural area preservation. These expenditures led to indirect benefits for the economy of Prince Edward Island, as described in Section 6.1.2.

6.1.2 Impacts of expenditures on the economy

"What are the economic impacts that result from participation in wildlife-related activities by residents of Prince Edward Island?" The impacts of the $19.5 million spent by Prince Edward Island residents are shown in Figure 6.1. They were estimated using the most advanced Statistics Canada Interprovincial Input–Output Model and according to procedures described in Section 3.2. Wildlife expenditures contributed over $15 million to the provincial gross domestic product and supported 424 jobs. Local and provincial levels of government received $2.6 million in revenue from diverse taxes. Based on the distribution of expenditures in Table 6.1, approximately 22% of all economic impacts can be attributed to participants in hunting.

Figure 6.1
Expenditures by participants in wildlife-related activities in Prince Edward Island in 1987 and resulting economic impacts

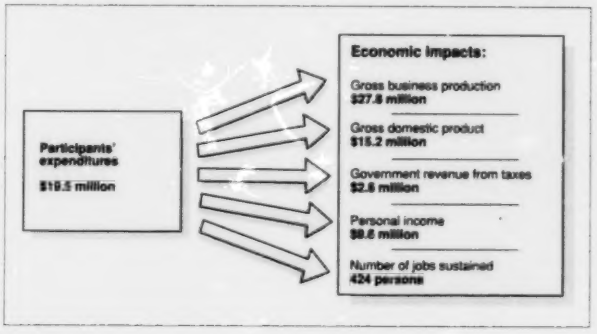


Table 6.1
Distribution of wildlife-related expenditures for Prince Edward Island in 1987*

Category of expenditure	Recreational hunting (%)	Non-consumptive and other activities (%)	All wildlife-related recreational activities (%)
Accommodation	2.1	5.4	4.7
Transportation	31.3	8.9	13.8
Food	9.4	5.9	6.7
Equipment	36.4	12.4	17.6
Other items	20.9	14.4	15.8
Wildlife organizations and natural area preservation	—	53.0	41.4
	100.0	100.0	100.0
Total ($)	4.2 million	15.3 million	19.5 million

* Some figures may not total perfectly because of rounding.

6.2 Direct benefits received by participants in wildlife-related activities

6.2.1 Net economic value of wildlife-related activities

"How much value do residents of Prince Edward Island place on wildlife-related activities?" Residents of Prince Edward Island derived significant net economic value from their participation in wildlife-related recreation during 1987 (Table 6.2). This value is estimated according to procedures described in Section 4.1. The enjoyment is worth an estimated $4.9 million, because participants stated that they would be willing to increase their expenditures by this amount before deciding to forego these activities. Table 6.2 shows the total and average net economic values for different types of activities.

Participants in primary non-consumptive trips received 40% of the total net economic value, whereas the remaining 60% accrued to hunters. Over half of the total net economic value of hunting was attributable to waterfowl hunting. Those who hunted waterfowl and large mammals derived a higher average yearly value than those participating in other types of activities. Per capita, the average yearly and daily values of hunting trips were more than twice those of non-hunting trips.

6.2.2 Present value of expected benefits from wildlife in future years

Because wildlife is a renewable resource managed by the government in trust, management activities should strive to maintain the direct benefits the resource provides to residents of Prince Edward Island (Fig. 6.2) year after year in perpetuity. If we assume that wildlife management programs from 1987 onwards will be successful in conserving wildlife populations for sustained utilization, then "What is the present value of the benefits from wildlife-related activities that are expected to occur year after year in the future?"

The question can be answered by estimating the present value of future wildlife-related recreation by residents of Prince Edward Island. This present value is shown in Figure 6.2 and is based on procedures and assumptions described in Section 4.2. Upper and lower bounds for the present value were computed using discount rates of 5% and 10%. A lower bound for the present value of $49 million was calculated using a discount rate of 10%. Based on a discount rate of 5%, this value would have an upper bound equivalent to $98 million.

Figure 6.2
Present value of future direct benefits from wildlife-related activities in Prince Edward Island estimated from net economic value of such activities in 1987

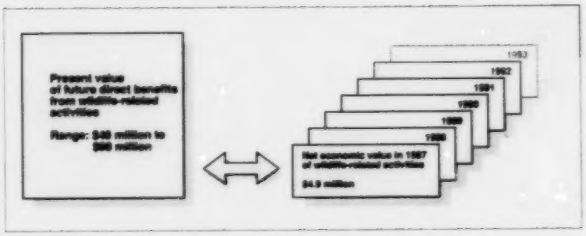


Table 6.2
Distribution of net economic values by wildlife-related activity for Prince Edward Island in 1987*

Wildlife-related activity	Average value per participant ($) Daily	Yearly	Annual value for all participants ($)	% distribution
Hunting				
• Large mammals	22.9	194.8	0.2 million	4.4
• Small mammals	10.8	131.8	0.6 million	12.0
• Waterfowl	13.9	226.6	1.5 million	30.8
• Other birds	12.1	120.2	0.6 million	12.8
All hunting	15.4†	319.8†	2.9 million	60.0
Primary non-consumptive trips	6.4	113.0	1.9 million	40.0
Total	—	—	4.9 million	100.0

* Figures may not total perfectly because of rounding.
† Average may seem high because many participants hunt more than one type of wildlife during the season.

7 Economic benefits of wildlife-related recreational activities for residents of Nova Scotia in 1987

In 1987, considerable economic benefits resulted from wildlife-related recreational activities in Nova Scotia. Money spent by those who engaged in wildlife-related activities generated significant economic impacts, which are described in Section 7.1. Participants in wildlife-related activities also derived a net economic value above and beyond the money they spent to take part in them. This net economic value is described in Section 7.2.

7.1 Indirect benefits to Nova Scotia's economy

7.1.1 Expenditures on wildlife-related activities

Residents of Nova Scotia spent over $155 million on wildlife-related activities during 1987. The distribution of this sum by activity and expenditure category is shown in Table 7.1. Of this total, approximately $50 million, almost a third, was spent on hunting, whereas nearly $106 million was spent on non-hunting activities, wildlife organizations, and natural area preservation. These expenditures led to indirect benefits for the economy of Nova Scotia, as described in Section 7.1.2.

7.1.2 Impacts of expenditures on the economy

"What are the economic impacts that result from participation in wildlife-related activities by residents of Nova Scotia?" The impacts of the $155.4 million spent by Nova Scotia residents are shown in Figure 7.1. They were estimated using the most advanced Statistics Canada Interprovincial Input–Output Model and according to procedures described in Section 3.2. Wildlife expenditures contributed over $140 million to the provincial gross domestic product and supported 3942 jobs. Local and provincial levels of government received about $28.3 million in revenue from diverse taxes. Based on the distribution of expenditures in Table 7.1, approximately one-third of all economic impacts can be attributed to participants in hunting.

Figure 7.1
Expenditures by participants in wildlife-related activities in Nova Scotia in 1987 and resulting economic impacts

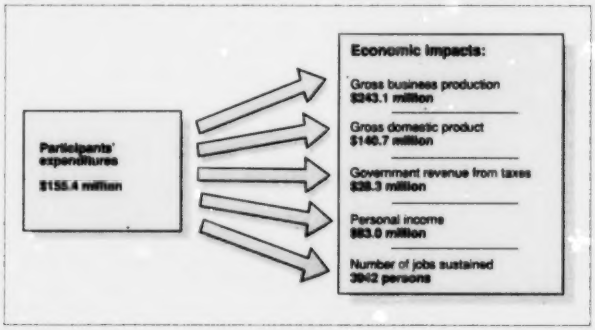


Table 7.1
Distribution of wildlife-related expenditures for Nova Scotia in 1987*

Category of expenditure	Recreational hunting (%)	Non-consumptive and other activities (%)	All wildlife-related recreational activities (%)
Accommodation	5.3	5.7	5.6
Transportation	25.4	15.7	18.8
Food	11.4	9.5	10.1
Equipment	36.4	18.3	24.1
Other items	21.5	16.0	17.7
Wildlife organizations and natural area preservation	—	34.8	23.7
	100.0	100.0	100.0
Total ($)	49.7 million	105.7 million	155.4 million

* Some figures may not total perfectly because of rounding.

7.2 Direct benefits received by participants in wildlife-related activities

7.2.1 Net economic value of wildlife-related activities

"How much value do residents of Nova Scotia place on wildlife-related activities?" Residents of Nova Scotia derived significant net economic value from their participation in wildlife-related recreation during 1987 (Table 7.2). This value is estimated according to procedures described in Section 4.1. The enjoyment is worth an estimated $48.3 million, because participants stated that they would be willing to increase their expenditures by this amount before deciding to forego these activities. Table 7.2 shows the total and average net economic values for different types of activities.

Participants in primary non-consumptive trips received 41% of the total net economic value, whereas the remaining 59% accrued to hunters. Over three-quarters of the total net economic value of hunting was attributable to the hunting of large and small mammals. Those who hunted waterfowl and large mammals derived a higher average yearly value than those participating in other types of activities. Per capita, the average yearly and daily values of hunting trips were considerably larger than those of non-hunting trips.

7.2.2 Present value of expected benefits from wildlife in future years

Because wildlife is a renewable resource managed by the government in trust, management activities should strive to maintain the direct benefits the resource provides to residents of Nova Scotia (Fig. 7.2) year after year in perpetuity. If we assume that wildlife management programs from 1987 onwards will be successful in conserving wildlife populations for sustained utilization, then "What is the present value of the benefits from wildlife-related activities that are expected to occur year after year in the future?"

The question can be answered by estimating the present value of future wildlife-related recreation by residents of Nova Scotia. This present value is shown in Figure 7.2 and is based on procedures and assumptions described in Section 4.2. Upper and lower bounds for the present value were computed using discount rates of 5% and 10%. A lower bound for the present value of $483 million was calculated using a discount rate of 10%. Based on a discount rate of 5%, this value would have an upper bound equivalent to $966 million.

Figure 7.2
Present value of future direct benefits from wildlife-related activities in Nova Scotia estimated from net economic value of such activities in 1987

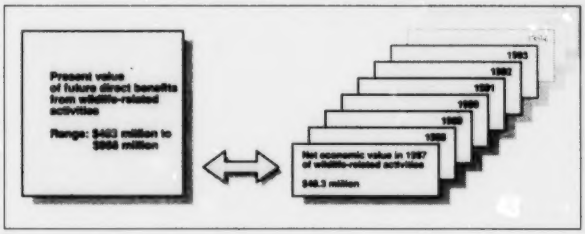


Table 7.2
Distribution of net economic values by wildlife-related activity for Nova Scotia in 1987*

Wildlife-related activity	Average value per participant ($) Daily	Yearly	Annual value for all participants ($)	% distribution
Hunting				
• Large mammals	13.4	183.8	16.6 million	34.4
• Small mammals	6.9	89.5	5.4 million	11.1
• Waterfowl	12.4	190.3	2.9 million	5.9
• Other birds	8.3	107.1	3.6 million	7.4
All hunting	12.1†	259.4†	28.4 million	58.9
Primary non-consumptive trips	7.2	107.7	19.8 million	41.1
Total	—	—	48.3 million	100.0

* Some figures may not total perfectly because of rounding.
† Average may seem high because many participants hunt more than one type of wildlife during the season.

8 Economic benefits of wildlife-related recreational activities for residents of New Brunswick in 1987

In 1987, considerable economic benefits resulted from wildlife-related recreational activities in New Brunswick. Money spent by those who engaged in wildlife-related activities generated significant economic impacts, which are described in Section 8.1. Participants in wildlife-related activities also derived a net economic value above and beyond the money they spent to take part in them. This net economic value is described in Section 8.2.

8.1 Indirect benefits to New Brunswick's economy

8.1.1 Expenditures on wildlife-related activities

Residents of New Brunswick spent almost $137 million on wildlife-related activities during 1987. The distribution of this sum by activity and expenditure category is shown in Table 8.1. Of this total, almost $57 million, or 41.3%, was spent on hunting, whereas $80 million was spent on non-hunting activities, wildlife organizations, and natural area preservation. These expenditures led to indirect benefits for the economy of New Brunswick, as described in Section 8.1.2.

8.1.2 Impacts of expenditures on the economy

"What are the economic impacts that result from participation in wildlife-related activities by residents of New Brunswick?" The impacts of the $136.8 million spent by New Brunswick residents are shown in Figure 8.1. They were estimated using the most advanced Statistics Canada Interprovincial Input-Output Model and according to procedures described in Section 3.2. Wildlife expenditures contributed almost $87 million to the provincial gross domestic product and supported 2532 jobs. Local and provincial levels of government received almost $21 million in revenue from diverse taxes. Based on the distribution of expenditures in Table 8.1, approximately 41% of all economic impacts can be attributed to participants in hunting.

Figure 8.1
Expenditures by participants in wildlife-related activities in New Brunswick in 1987 and resulting economic impacts

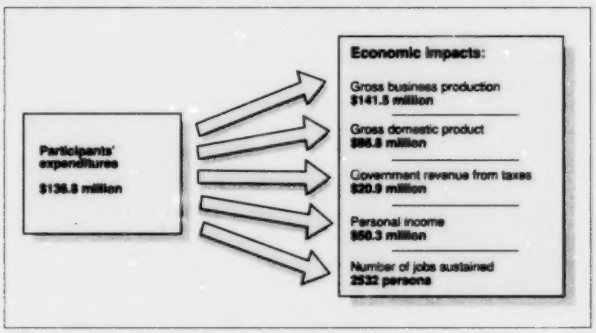


Table 8.1
Distribution of wildlife-related expenditures for New Brunswick in 1987*

Category of expenditure	Recreational hunting (%)	Non-consumptive and other activities (%)	All wildlife-related recreational activities (%)
Accommodation	3.2	3.7	3.5
Transportation	26.7	18.1	21.7
Food	13.8	10.4	11.8
Equipment	41.4	40.4	40.8
Other items	14.8	16.4	15.7
Wildlife organizations and natural area preservation	—	11.0	6.5
	100.0	100.0	100.0
Total ($)	56.6 million	80.1 million	136.8 million

* Some figures may not total perfectly because of rounding.

8.2 Direct benefits received by participants in wildlife-related activities

8.2.1 Net economic value of wildlife-related activities

"How much value do residents of New Brunswick place on wildlife-related activities?" Residents of New Brunswick derived significant net economic value from their participation in wildlife-related recreation during 1987 (Table 8.2). This value is estimated according to procedures described in Section 4.1. The enjoyment is worth an estimated $40.3 million, because participants stated that they would be willing to increase their expenditures by this amount before deciding to forego these activities. Table 8.2 shows the total and average net economic values for different types of activities.

Participants in primary non-consumptive trips received almost 35% of the total net economic value, whereas the remaining 65% accrued to hunters. Over three-quarters of the total net economic value of hunting was attributable to the hunting of large mammals and other birds. Those who hunted waterfowl and large mammals derived a higher average yearly value than those participating in other types of activities. Per capita, the average yearly and daily values of hunting trips were approximately twice those of non-hunting trips.

8.2.2 Present value of expected benefits from wildlife in future years

Because wildlife is a renewable resource managed by the government in trust, management activities should strive to maintain the direct benefits the resource provides to residents of New Brunswick (Fig. 8.2) year after year in perpetuity. If we assume that wildlife management programs from 1987 onwards will be successful in conserving wildlife populations for sustained utilization, then "What is the present value of the benefits from wildlife-related activities that are expected to occur year after year in the future?"

The question can be answered by estimating the present value of future wildlife-related recreation by residents of New Brunswick. This present value is shown in Figure 8.2 and is based on procedures and assumptions described in Section 4.2. Upper and lower bounds for the present value were computed using discount rates of 5% and 10%. A lower bound for the present value of $403 million was calculated using a discount rate of 10%. Based on a discount rate of 5%, this value would have an upper bound equivalent to $806 million.

Figure 8.2
Present value of future direct benefits from wildlife-related activities in New Brunswick estimated from net economic value of such activities in 1987

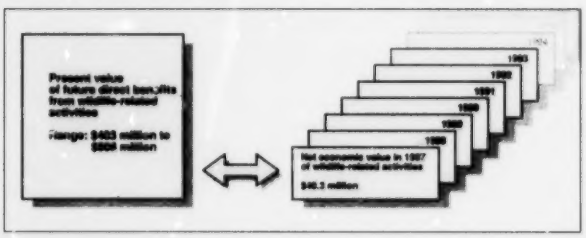


Table 8.2
Distribution of net economic values by wildlife-related activity for New Brunswick in 1987*

Wildlife-related activity	Average value per participant ($) Daily	Yearly	Annual value for all participants ($)	% distribution
Hunting				
• Large mammals	13.5	153.9	14.4 million	35.7
• Small mammals	5.1	69.9	3.2 million	7.9
• Waterfowl	12.2	154.9	2.3 million	5.7
• Other birds	7.4	92.3	6.5 million	16.1
All hunting	12.8†	223.6†	26.4 million	65.4
Primary non-consumptive trips	6.0	114.2	14.0 million	34.6
Total	—	—	40.3 million	100.0

* Some figures may not total perfectly because of rounding.
† Average may seem high because many participants hunt more than one type of wildlife during the season.

9 Economic benefits of wildlife-related recreational activities for residents of Quebec in 1987

In 1987, considerable economic benefits resulted from wildlife-related recreational activities in Quebec. Money spent by those who engaged in wildlife-related activities generated significant economic impacts, which are described in Section 9.1. Participants in wildlife-related activities also derived a net economic value above and beyond the money they spent to take part in them. This net economic value is described in Section 9.2.

9.1 Indirect benefits to Quebec's economy

9.1.1 Expenditures on wildlife-related activities

Residents of Quebec spent almost $1 billion on wildlife-related activities during 1987. The distribution of this sum by activity and expenditure category is shown in Table 9.1. Of this total, more than $225 million, or 23%, was spent on hunting, whereas nearly $744 million was spent on non-hunting activities, wildlife organizations, and natural area preservation. These expenditures led to indirect benefits for the economy of Quebec, as described in Section 9.1.2.

9.1.2 Impacts of expenditures on the economy

"What are the economic impacts that result from participation in wildlife-related activities by residents of Quebec?" The impacts of the $968.8 million spent by Quebec residents are shown in Figure 9.1. They were estimated using the most advanced Statistics Canada Interprovincial Input–Output Model and according to procedures described in Section 3.2. Wildlife expenditures contributed more than $1.3 billion to the provincial gross domestic product and supported 40 402 jobs. Local and provincial levels of government received $289 million in revenue from diverse taxes. Based on the distribution of expenditures in Table 9.1, approximately 23% of all economic impacts can be attributed to participants in hunting.

Figure 9.1
Expenditures by participants in wildlife-related activities in Quebec in 1987 and resulting economic impacts

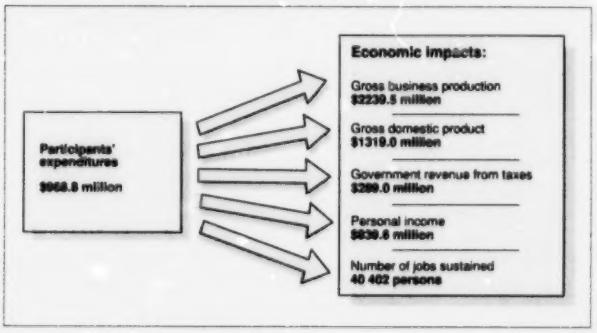


Table 9.1
Distribution of wildlife-related expenditures for Quebec in 1987*

Category of expenditure	Recreational hunting (%)	Non-consumptive and other activities (%)	All wildlife-related recreational activities (%)
Accommodation	7.2	9.0	8.6
Transportation	28.0	19.2	21.3
Food	15.5	13.1	13.6
Equipment	32.7	21.8	24.3
Other items	16.6	22.2	20.9
Wildlife organizations and natural area preservation	—	14.7	11.3
	100.0	100.0	100.0
Total ($)	225.2 million	743.6 million	968.8 million

* Some figures may not total perfectly because of rounding.

9.2 Direct benefits received by participants in wildlife-related activities

9.2.1 Net economic value of wildlife-related activities

"How much value do residents of Quebec place on wildlife-related activities?" Residents of Quebec derived significant net economic value from their participation in wildlife-related recreation during 1987 (Table 9.2). This value is estimated according to procedures described in Section 4.1. The enjoyment is worth an estimated $169.9 million, because participants stated that they would be willing to increase their expenditures by this amount before deciding to forego these activities. Table 9.2 shows the total and average net economic values for different types of activities.

Participants in primary non-consumptive trips received almost 58% of the total net economic value, whereas the remaining 42% accrued to hunters. Over two-thirds of the total net economic value of hunting was attributable to the hunting of large and small mammals. Those who hunted large mammals and waterfowl derived a higher average yearly value than those participating in other types of activities. Per capita, the average yearly and daily values of hunting trips were approximately twice those of non-hunting trips.

9.2.2 Present value of expected benefits from wildlife in future years

Because wildlife is a renewable resource managed by the government in trust, management activities should strive to maintain the direct benefits the resource provides to residents of Quebec (Fig. 9.2) year after year in perpetuity. If we assume that wildlife management programs from 1987 onwards will be successful in conserving wildlife populations for sustained utilization, then "What is the present value of the benefits from wildlife-related activities that are expected to occur year after year in the future?"

The question can be answered by estimating the present value of future wildlife-related recreation by residents of Quebec. This present value is shown in Figure 9.2 and is based on procedures and assumptions described in Section 4.2. Upper and lower bounds for the present value were computed using discount rates of 5% and 10%. A lower bound for the present value of approximately $1.7 billion was calculated using a discount rate of 10%. Based on a discount rate of 5%, this value would have an upper bound equivalent to approximately $3.4 billion.

Figure 9.2
Present value of future direct benefits from wildlife-related activities in Quebec estimated from net economic value of such activities in 1987

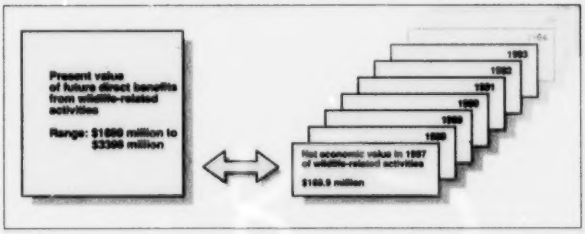


Table 9.2
Distribution of net economic values by wildlife-related activity for Quebec in 1987*

Wildlife-related activity	Average value per participant ($) Daily	Yearly	Annual value for all participants ($)	% distribution
Hunting				
• Large mammals	14.1	154.2	34.4 million	20.3
• Small mammals	5.2	61.5	15.1 million	8.9
• Waterfowl	10.6	109.3	9.9 million	5.8
• Other birds	5.4	55.9	12.1 million	7.1
All hunting	11.3†	167.7†	71.5 million	42.1
Primary non-consumptive trips	5.3	84.3	98.4 million	57.9
Total	—	—	169.9 million	100.0

* Some figures may not total perfectly because of rounding.
† Average may seem high because many participants hunt more than one type of wildlife during the season.

10 Economic benefits of wildlife-related recreational activities for residents of Ontario in 1987

In 1987, considerable economic benefits resulted from wildlife-related recreational activities in Ontario. Money spent by those who engaged in wildlife-related activities generated significant economic impacts, which are described in Section 10.1. Participants in wildlife-related activities also derived a net economic value above and beyond the money they spent to take part in them. This net economic value is described in Section 10.2.

10.1 Indirect benefits to Ontario's economy

10.1.1 Expenditures on wildlife-related activities

Residents of Ontario spent more than $1.6 billion on wildlife-related activities during 1987. The distribution of this sum by activity and expenditure category is shown in Table 10.1. Of this total, $314 million, or 19%, was spent on hunting, whereas over $1.3 billion was spent on non-hunting activities, wildlife organizations, and natural area preservation. These expenditures led to indirect benefits for the economy of Ontario, as described in Section 10.1.2.

10.1.2 Impacts of expenditures on the economy

"What are the economic impacts that result from participation in wildlife-related activities by residents of Ontario?" The impacts of the $1.6 billion spent by Ontario residents are shown in Figure 10.1. They were estimated using the most advanced Statistics Canada Interprovincial Input–Output Model and according to procedures described in Section 3.2. Wildlife expenditures contributed more than $2.2 billion to the provincial gross domestic product and supported 61 935 jobs. Local and provincial levels of government received more than $363 million in revenue from diverse taxes. Based on the distribution of expenditures in Table 10.1, approximately 19% of all economic impacts can be attributed to participants in hunting.

Figure 10.1
Expenditures by participants in wildlife-related activities in Ontario in 1987 and resulting economic impacts

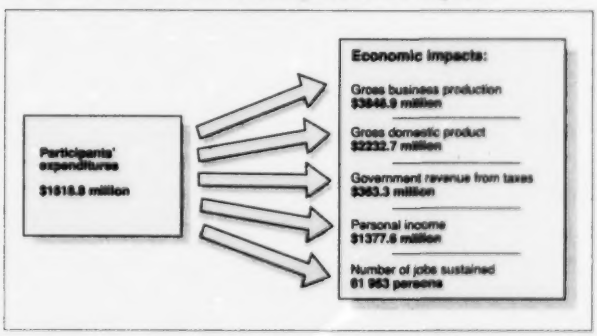


Table 10.1
Distribution of wildlife-related expenditures for Ontario in 1987*

Category of expenditure	Recreational hunting (%)	Non-consumptive and other activities (%)	All wildlife-related recreational activities (%)
Accommodation	7.2	8.1	7.9
Transportation	23.6	15.9	17.4
Food	12.5	8.8	9.5
Equipment	39.4	20.6	24.3
Other items	17.3	17.5	17.5
Wildlife organizations and natural area preservation	—	29.1	23.5
	100.0	100.0	100.0
Total ($)	314.0 million	1304.8 million	1618.8 million

* Some figures may not total perfectly because of rounding.

10.2 Direct benefits received by participants in wildlife-related activities

10.2.1 Net economic value of wildlife-related activities

"How much value do residents of Ontario place on wildlife-related activities?" Residents of Ontario derived significant net economic value from their participation in wildlife-related recreation during 1987 (Table 10.2). This value is estimated according to procedures described in Section 4.1. The enjoyment is worth an estimated $371.1 million, because participants stated that they would be willing to increase their expenditures by this amount before deciding to forego these activities. Table 10.2 shows the total and average net economic values for different types of activities.

Participants in primary non-consumptive trips received almost 56% of the total net economic value, whereas the remaining 44% accrued to hunters. Almost two-thirds of the total net economic value of hunting was attributable to the hunting of large mammals and other birds. Those who hunted large mammals and waterfowl derived a higher average yearly value than those participating in other types of activities. Per capita, the average yearly and daily values of hunting trips were more than twice those of non-hunting trips.

10.2.2 Present value of expected benefits from wildlife in future years

Because wildlife is a renewable resource managed by the government in trust, management activities should strive to maintain the direct benefits the resource provides to residents of Ontario (Fig. 10.2) year after year in perpetuity. If we assume that wildlife management programs from 1987 onwards will be successful in conserving wildlife populations for sustained utilization, then "What is the present value of the benefits from wildlife-related activities that are expected to occur year after year in the future?"

The question can be answered by estimating the present value of future wildlife-related recreation by residents of Ontario. This present value is shown in Figure 10.2 and is based on procedures and assumptions described in Section 4.2. Upper and lower bounds for the present value were computed using discount rates of 5% and 10%. A lower bound for the present value of approximately $3.7 billion was calculated using a discount rate of 10%. Based on a discount rate of 5%, this value would have an upper bound equivalent to approximately $7.4 billion.

Figure 10.2
Present value of future direct benefits from wildlife-related activities in Ontario estimated from net economic value of such activities in 1987

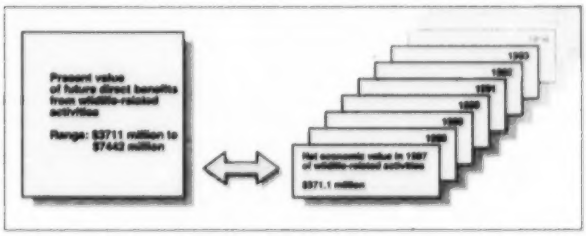


Table 10.2
Distribution of net economic values by wildlife-related activity for Ontario in 1987*

Wildlife-related activity	Average value per participant ($) Daily	Yearly	Annual value for all participants ($)	% distribution
Hunting				
• Large mammals	23.8	257.0	66.4 million	17.9
• Small mammals	11.2	126.1	24.9 million	6.7
• Waterfowl	17.8	192.2	35.1 million	9.5
• Other birds	13.2	141.3	38.2 million	10.3
All hunting	19.9†	366.5†	164.5 million	44.3
Primary non-consumptive trips	8.2	132.9	206.6 million	55.7
Total	—	—	371.1 million	100.0

* Some figures may not total perfectly because of rounding.
† Average may seem high because many participants hunt more than one type of wildlife during the season.

11 Economic benefits of wildlife-related recreational activities for residents of Manitoba in 1987

In 1987, considerable economic benefits resulted from wildlife-related recreational activities in Manitoba. Money spent by those who engaged in wildlife-related activities generated significant economic impacts, which are described in Section 11.1. Participants in wildlife-related activities also derived a net economic value above and beyond the money they spent to take part in them. This net economic value is described in Section 11.2.

11.1 Indirect benefits to Manitoba's economy

11.1.1 Expenditures on wildlife-related activities

Residents of Manitoba spent over $195 million on wildlife-related activities during 1987. The distribution of this sum by activity and expenditure category is shown in Table 11.1. Of this total, almost $65 million, or a third, was spent on hunting, whereas nearly $131 million was spent on non-hunting activities, wildlife organizations, and natural area preservation. These expenditures led to indirect benefits for the economy of Manitoba, as described in Section 11.1.2.

11.1.2 Impacts of expenditures on the economy

"What are the economic impacts that result from participation in wildlife-related activities by residents of Manitoba?" The impacts of the $195.3 million spent by Manitoba residents are shown in Figure 11.1. They were estimated using the most advanced Statistics Canada Interprovincial Input–Output Model and according to procedures described in Section 3.2. Wildlife expenditures contributed over $202 million to the provincial gross domestic product and supported 6327 jobs. Local and provincial levels of government received more than $33 million in revenue from diverse taxes. Based on the distribution of expenditures in Table 11.1, approximately one-third of all economic impacts can be attributed to participants in hunting.

Figure 11.1
Expenditures by participants in wildlife-related activities in Manitoba in 1987 and resulting economic impacts

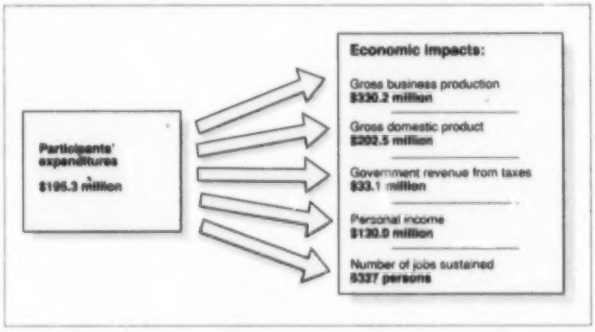


Table 11.1
Distribution of wildlife-related expenditures for Manitoba in 1987*

Category of expenditure	Recreational hunting (%)	Non-consumptive and other activities (%)	All wildlife-related recreational activities (%)
Accommodation	7.9	6.2	6.8
Transportation	24.1	15.1	18.1
Food	13.5	8.7	10.3
Equipment	36.2	32.7	33.9
Other items	18.3	16.0	16.7
Wildlife organizations and natural area preservation	—	21.2	14.2
	100.0	100.0	100.0
Total ($)	64.7 million	130.6 million	195.3 million

* Some figures may not total perfectly because of rounding.

11.2 Direct benefits received by participants in wildlife-related activities

11.2.1 Net economic value of wildlife-related activities

"How much value do residents of Manitoba place on wildlife-related activities?" Residents of Manitoba derived significant net economic value from their participation in wildlife-related recreation during 1987 (Table 11.2). This value is estimated according to procedures described in Section 4.1. The enjoyment is worth an estimated $39.8 million, because participants stated that they would be willing to increase their expenditures by this amount before deciding to forego these activities. Table 11.2 shows the total and average net economic values for different types of activities.

Participants in primary non-consumptive trips received more than 52% of the total net economic value, whereas the remaining 48% accrued to hunters. Approximately two-thirds of the total net economic value of hunting was attributable to the hunting of large mammals and waterfowl. Those who hunted waterfowl and large mammals derived a higher average yearly value than those participating in other types of activities. Per capita, the average yearly and daily values of hunting trips were more than twice those of non-hunting trips.

11.2.2 Present value of expected benefits from wildlife in future years

Because wildlife is a renewable resource managed by the government in trust, management activities should strive to maintain the direct benefits the resource provides to residents of Manitoba (Fig. 11.2) year after year in perpetuity. If we assume that wildlife management programs from 1987 onwards will be successful in conserving wildlife populations for sustained utilization, then "What is the present value of the benefits from wildlife-related activities that are expected to occur year after year in the future?"

The question can be answered by estimating the present value of future wildlife-related recreation by residents of Manitoba. This present value is shown in Figure 11.2 and is based on procedures and assumptions described in Section 4.2. Upper and lower bounds for the present value were computed using discount rates of 5% and 10%. A lower bound for the present value of $398 million was calculated using a discount rate of 10%. Based on a discount rate of 5%, this value would have an upper bound equivalent to $796 million.

Figure 11.2
Present value of future direct benefits from wildlife-related activities in Manitoba estimated from net economic value of such activities in 1987

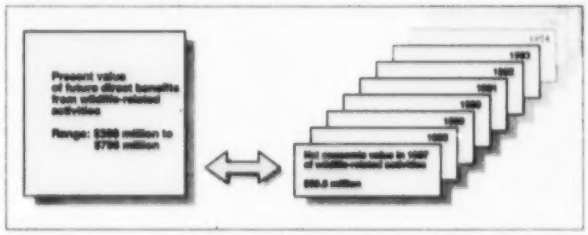


Table 11.2
Distribution of net economic values by wildlife-related activity for Manitoba in 1987*

Wildlife-related activity	Average value per participant ($) Daily	Yearly	Annual value for all participants ($)	% distribution
Hunting				
• Large mammals	15.2	149.1	6.9 million	17.4
• Small mammals	6.7	82.1	2.2 million	5.5
• Waterfowl	16.6	154.4	5.8 million	14.6
• Other birds	12.6	110.6	4.1 million	10.2
All hunting	16.6†	249.3†	19.0 million	47.8
Primary non-consumptive trips	6.6	118.3	20.8 million	52.2
Total	—	—	39.8 million	100.0

* Some figures may not total perfectly because of rounding.
† Average may seem high because many participants hunt more than one type of wildlife during the season.

12 Economic benefits of wildlife-related recreational activities for residents of Saskatchewan in 1987

In 1987, considerable economic benefits resulted from wildlife-related recreational activities in Saskatchewan. Money spent by those who engaged in wildlife-related activities generated significant economic impacts, which are described in Section 12.1. Participants in wildlife-related activities also derived a net economic value above and beyond the money they spent to take part in them. This net economic value is described in Section 12.2.

12.1 Indirect benefits to Saskatchewan's economy

12.1.1 Expenditures on wildlife-related activities

Residents of Saskatchewan spent almost $224 million on wildlife-related activities during 1987. The distribution of this sum by activity and expenditure category is shown in Table 12.1. Of this total, more than $42 million, or 19%, was spent on hunting, whereas nearly $182 million was spent on non-hunting activities, wildlife organizations, and natural area preservation. These expenditures led to indirect benefits for the economy of Saskatchewan, as described in Section 12.1.2.

12.1.2 Impacts of expenditures on the economy

"What are the economic impacts that result from participation in wildlife-related activities by residents of Saskatchewan?" The impacts of the $223.8 million spent by Saskatchewan residents are shown in Figure 12.1. They were estimated using the most advanced Statistics Canada Interprovincial Input–Output Model and according to procedures described in Section 3.2. Wildlife expenditures contributed over $220 million to the provincial gross domestic product and supported 4576 jobs. Local and provincial levels of government received more than $37 million in revenue from diverse taxes. Based on the distribution of expenditures in Table 12.1, approximately 19% of all economic impacts can be attributed to participants in hunting.

Figure 12.1
Expenditures by participants in wildlife-related activities in Saskatchewan in 1987 and resulting economic impacts

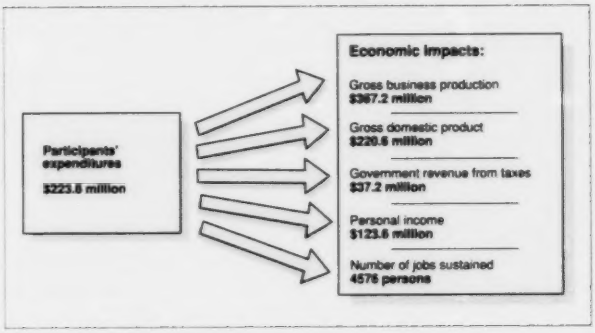


Table 12.1
Distribution of wildlife-related expenditures for Saskatchewan in 1987*

Category of expenditure	Recreational hunting (%)	Non-consumptive and other activities (%)	All wildlife-related recreational activities (%)
Accommodation	3.6	3.5	3.5
Transportation	27.2	8.2	11.8
Food	10.0	5.3	6.2
Equipment	34.6	24.4	26.3
Other items	24.6	7.7	10.9
Wildlife organizations and natural area preservation	—	50.8	41.3
	100.0	100.0	100.0
Total ($)	42.3 million	181.5 million	223.8 million

* Some figures may not total perfectly because of rounding.

12.2 Direct benefits received by participants in wildlife-related activities

12.2.1 Net economic value of wildlife-related activities

"How much value do residents of Saskatchewan place on wildlife-related activities?" Residents of Saskatchewan derived significant net economic value from their participation in wildlife-related recreation during 1987 (Table 12.2). This value is estimated according to procedures described in Section 4.1. The enjoyment is worth an estimated $34.3 million, because participants stated that they would be willing to increase their expenditures by this amount before deciding to forego these activities. Table 12.2 shows the total and average net economic values for different types of activities.

Participants in primary non-consumptive trips received almost 48% of the total net economic value, whereas the remaining 52% accrued to hunters. Approximately two-thirds of the total net economic value of hunting was attributable to the hunting of large mammals and waterfowl. Those who hunted large mammals and waterfowl derived a higher average yearly value than those participating in other types of activities. Per capita, the average yearly and daily values of hunting trips were considerably larger than those of non-hunting trips.

12.2.2 Present value of expected benefits from wildlife in future years

Because wildlife is a renewable resource managed by the government in trust, management activities should strive to maintain the direct benefits the resource provides to residents of Saskatchewan (Fig. 12.2) year after year in perpetuity. If we assume that wildlife management programs from 1987 onwards will be successful in conserving wildlife populations for sustained utilization, then "What is the present value of the benefits from wildlife-related activities that are expected to occur year after year in the future?"

The question can be answered by estimating the present value of future wildlife-related recreation by residents of Saskatchewan. This present value is shown in Figure 12.2 and is based on procedures and assumptions described in Section 4.2. Upper and lower bounds for the present value were computed using discount rates of 5% and 10%. A lower bound for the present value of $343 million was calculated using a discount rate of 10%. Based on a discount rate of 5%, this value would have an upper bound equivalent to $686 million.

Figure 12.2
Present value of future direct benefits from wildlife-related activities in Saskatchewan estimated from net economic value of such activities in 1987

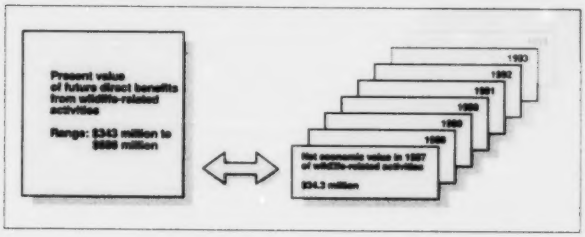


Table 12.2
Distribution of net economic values by wildlife-related activity for Saskatchewan in 1987*

Wildlife-related activity	Average value per participant ($)		Annual value for all participants ($)	% distribution
	Daily	Yearly		
Hunting				
• Large mammals	19.3	148.8	7.5 million	21.9
• Small mammals	7.5	77.8	2.3 million	6.6
• Waterfowl	17.4	141.3	4.4 million	13.0
• Other birds	12.9	99.2	3.7 million	10.8
All hunting	17.0†	221.3†	17.9 million	52.3
Primary non-consumptive trips	7.5	120.7	16.3 million	47.7
Total	—	—	34.3 million	100.0

* Some figures may not total perfectly because of rounding.
† Average may seem high because many participants hunt more than one type of wildlife during the season.

13 Economic benefits of wildlife-related recreational activities for residents of Alberta in 1987

In 1987, considerable economic benefits resulted from wildlife-related recreational activities in Alberta. Money spent by those who engaged in wildlife-related activities generated significant economic impacts, which are described in Section 13.1. Participants in wildlife-related activities also derived a net economic value above and beyond the money they spent to take part in them. This net economic value is described in Section 13.2.

13.1 Indirect benefits to Alberta's economy

13.1.1 Expenditures on wildlife-related activities

Residents of Alberta spent over $661 million on wildlife-related activities during 1987. The distribution of this sum by activity and expenditure category is shown in Table 13.1. Of this total, nearly $125 million, or 19%, was spent on hunting, whereas more than $537 million was spent on non-hunting activities, wildlife organizations, and natural area preservation. These expenditures led to indirect benefits for the economy of Alberta, as described in Section 13.1.2.

13.1.2 Impacts of expenditures on the economy

"What are the economic impacts that result from participation in wildlife-related activities by residents of Alberta?" The impacts of the $661.3 million spent by Alberta residents are shown in Figure 13.1. They were estimated using the most advanced Statistics Canada Interprovincial Input–Output Model and according to procedures described in Section 3.2. Wildlife expenditures contributed over $1 billion to the provincial gross domestic product and supported 15 727 jobs. Local and provincial levels of government received more than $126 million in revenue from diverse taxes. Based on the distribution of expenditures in Table 13.1, approximately 19% of all economic impacts can be attributed to participants in hunting.

Figure 13.1
Expenditures by participants in wildlife-related activities in Alberta in 1987 and resulting economic impacts

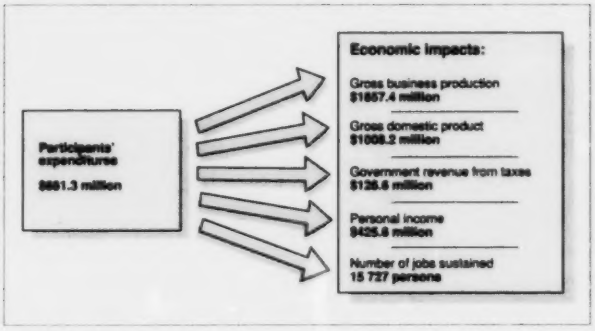


Table 13.1
Distribution of wildlife-related expenditures for Alberta in 1987*

Category of expenditure	Recreational hunting (%)	Non-consumptive and other activities (%)	All wildlife-related recreational activities (%)
Accommodation	3.3	5.4	5.0
Transportation	24.5	14.1	16.1
Food	11.7	8.0	8.7
Equipment	44.0	26.4	29.7
Other items	16.5	10.3	11.5
Wildlife organizations and natural area preservation	—	35.8	29.0
	100.0	100.0	100.0
Total ($)	124.7 million	537.1 million	661.3 million

* Some figures may not total perfectly because of rounding.

13.2 Direct benefits received by participants in wildlife-related activities

13.2.1 Net economic value of wildlife-related activities

"How much value do residents of Alberta place on wildlife-related activities?" Residents of Alberta derived significant net economic value from their participation in wildlife-related recreation during 1987 (Table 13.2). This value is estimated according to procedures described in Section 4.1. The enjoyment is worth an estimated $117.5 million, because participants stated that they would be willing to increase their expenditures by this amount before deciding to forego these activities. Table 13.2 shows the total and average net economic values for different types of activities.

Participants in primary non-consumptive trips received nearly 55% of the total net economic value, whereas the remaining 45% accrued to hunters. Two-thirds of the total net economic value of hunting was attributable to the hunting of large mammals and waterfowl. Those who hunted large mammals and waterfowl derived a higher average yearly value than those participating in other types of activities. Per capita, the average yearly and daily values of hunting trips were considerably larger than those of non-hunting trips.

13.2.2 Present value of expected benefits from wildlife in future years

Because wildlife is a renewable resource managed by the government in trust, management activities should strive to maintain the direct benefits the resource provides to residents of Alberta (Fig. 13.2) year after year in perpetuity. If we assume that wildlife management programs from 1987 onwards will be successful in conserving wildlife populations for sustained utilization, then "What is the present value of the benefits from wildlife-related activities that are expected to occur year after year in the future?"

The question can be answered by estimating the present value of future wildlife-related recreation by residents of Alberta. This present value is shown in Figure 13.2 and is based on procedures and assumptions described in Section 4.2. Upper and lower bounds for the present value were computed using discount rates of 5% and 10%. A lower bound for the present value of approximately $1.2 billion was calculated using a discount rate of 10%. Based on a discount rate of 5%, this value would have an upper bound equivalent to approximately $2.4 billion.

Figure 13.2
Present value of future direct benefits from wildlife-related activities in Alberta estimated from net economic value of such activities in 1987

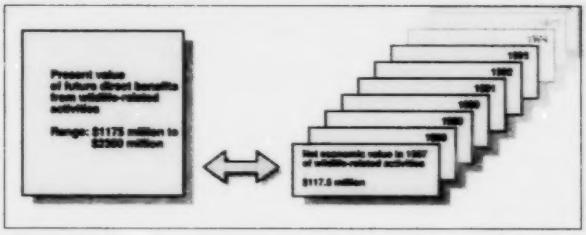


Table 13.2
Distribution of net economic values by wildlife-related activity for Alberta in 1987*

Wildlife-related activity	Average value per participant ($) Daily	Yearly	Annual value for all participants ($)	% distribution
Hunting				
• Large mammals	16.2	211.1	24.9 million	21.2
• Small mammals	11.6	119.1	6.8 million	5.8
• Waterfowl	20.2	171.8	10.0 million	8.7
• Other birds	14.1	130.0	11.0 million	9.4
All hunting	19.1†	291.7†	53.0 million	45.1
Primary non-consumptive trips	7.9	163.0	64.5 million	54.9
Total	—	—	117.5 million	100.0

* Some figures may not total perfectly because of rounding.
† Average may seem high because many participants hunt more than one type of wildlife during the season.

14 Economic benefits of wildlife-related recreational activities for residents of British Columbia in 1987

In 1987, considerable economic benefits resulted from wildlife-related recreational activities in British Columbia. Money spent by those who engaged in wildlife-related activities generated significant economic impacts, which are described in Section 14.1. Participants in wildlife-related activities also derived a net economic value above and beyond the money they spent to take part in them. This net economic value is described in Section 14.2.

14.1 Indirect benefits to British Columbia's economy

14.1.1 Expenditures on wildlife-related activities

Residents of British Columbia spent over $1 billion on wildlife-related activities during 1987. The distribution of this sum by activity and expenditure category is shown in Table 14.1. Of this total, more than $137 million, or 13.2%, was spent on hunting, whereas more than $901 million was spent on non-hunting activities, wildlife organizations, and natural area preservation. These expenditures led to indirect benefits for the economy of British Columbia, as described in Section 14.1.2.

14.1.2 Impacts of expenditures on the economy

"What are the economic impacts that result from participation in wildlife-related activities by residents of British Columbia?" The impacts of the $1 billion spent by British Columbia residents are shown in Figure 14.1. They were estimated using the most advanced Statistics Canada Interprovincial Input–Output Model and according to procedures described in Section 3.2. Wildlife expenditures contributed over $1 billion to the provincial gross domestic product and supported 21 756 jobs. Local and provincial levels of government received almost $184 million in revenue from diverse taxes. Based on the distribution of expenditures in Table 14.1, approximately 13% of all economic impacts can be attributed to participants in hunting.

Figure 14.1
Expenditures by participants in wildlife-related activities in British Columbia in 1987 and resulting economic impacts

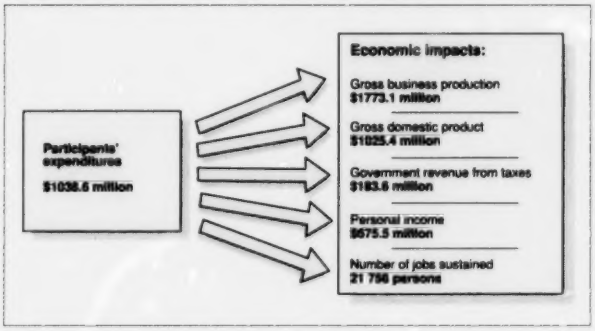


Table 14.1
Distribution of wildlife-related expenditures for British Columbia in 1987*

Category of expenditure	Recreational hunting (%)	Non-consumptive and other activities (%)	All wildlife-related recreational activities (%)
Accommodation	2.7	2.9	2.8
Transportation	25.0	11.6	13.4
Food	10.4	5.2	5.9
Equipment	50.2	15.8	20.4
Other items	11.8	8.1	8.6
Wildlife organizations and natural area preservation	—	56.4	48.9
	100.0	100.0	100.0
Total ($)	137.4 million	901.3 million	1038.6 million

* Some figures may not total perfectly because of rounding.

14.2 Direct benefits received by participants in wildlife-related activities

14.2.1 Net economic value of wildlife-related activities

"How much value do residents of British Columbia place on wildlife-related activities?" Residents of British Columbia derived significant net economic value from their participation in wildlife-related recreation during 1987 (Table 14.2). This value is estimated according to procedures described in Section 4.1. The enjoyment is worth an estimated $133 million, because participants stated that they would be willing to increase their expenditures by this amount before deciding to forego these activities. Table 14.2 shows the total and average net economic values for different types of activities.

Participants in primary non-consumptive trips received more than 64% of the total net economic value, whereas the remaining 36% accrued to hunters. Over three-quarters of the total net economic value of hunting was attributable to the hunting of large mammals and waterfowl. Those who hunted large mammals and waterfowl derived a higher average yearly value than those participating in other types of activities. Per capita, the average yearly and daily values of hunting trips were approximately twice those of non-hunting trips.

14.2.2 Present value of expected benefits from wildlife in future years

Because wildlife is a renewable resource managed by the government in trust, management activities should strive to maintain the direct benefits the resource provides to residents of British Columbia (Fig. 14.2) year after year in perpetuity. If we assume that wildlife management programs from 1987 onwards will be successful in conserving wildlife populations for sustained utilization, then "What is the present value of the benefits from wildlife-related activities that are expected to occur year after year in the future?"

The question can be answered by estimating the present value of future wildlife-related recreation by residents of British Columbia. This present value is shown in Figure 14.2 and is based on procedures and assumptions described in Section 4.2. Upper and lower bounds for the present value were computed using discount rates of 5% and 10%. A lower bound for the present value of approximately $1.3 billion was calculated using a discount rate of 10%. Based on a discount rate of 5%, this value would have an upper bound equivalent to approximately $2.7 billion.

Figure 14.2
Present value of future direct benefits from wildlife-related activities in British Columbia estimated from net economic value of such activities in 1987

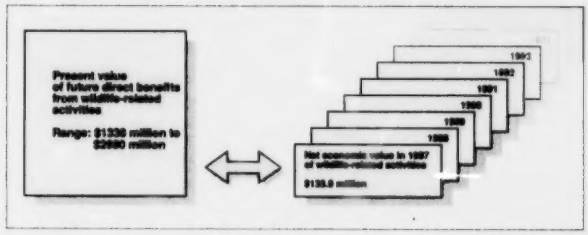


Table 14.2
Distribution of net economic values by wildlife-related activity for British Columbia in 1987*

Wildlife-related activity	Average value per participant ($) Daily	Yearly	Annual value for all participants ($)	% distribution
Hunting				
• Large mammals	15.2	245.8	30.5 million	22.9
• Small mammals	6.8	64.6	1.5 million	1.1
• Waterfowl	18.9	204.5	6.3 million	4.7
• Other birds	10.0	107.9	9.1 million	6.8
All hunting	17.3†	296.5†	47.3 million	35.6
Primary non-consumptive trips	7.9	148.4	85.7 million	64.4
Total	—	—	133.0 million	100.0

* Some figures may not total perfectly because of rounding.
† Average may seem high because many participants hunt more than one type of wildlife during the season.

15 Selected comparisons with 1981 results

This chapter compares selected economic findings from Chapters 3 to 14 in this report with those obtained for 1981.[1] The results from two methods of comparison are presented: one method corrects for the effect of inflation over time (Section 15.2), and the other does not (Section 15.1).

15.1 Comparisons based on current dollars

A comparison of the 1981 and 1987 survey findings confirms the magnitude of the benefits derived from wildlife-related recreational activities. Table 15.1 reveals that participants in wildlife-related activities spent nearly $1 billion more in 1987 than in 1981—an increase of 21.4% in current dollars. The economic indicators, in current dollars, for indirect benefits rose between 23.3% and 31.6%, while direct benefits rose by 25% between the two periods.

A review of the provincial results reveals that increases occurred in all provinces with the exception of Newfoundland and Saskatchewan. Between 1981 and 1987, expenditures on wildlife activities decreased in Newfoundland by 13%, resulting in lower indirect benefits in that province. During the same period, however, direct benefits increased by 12.3% in that province. The situation was reversed in Saskatchewan where indirect benefits increased while direct benefits decreased.

15.2 Comparisons based on constant dollars

Between 1981 and 1987, the **Consumer Price Index (CPI)** for Canada increased from 100 to 138.2, an average annual inflation rate of 6.4%. A comparison of 1987 results with those of 1981 in constant dollars reveals that expenditures and direct benefits have not kept pace with inflation. This is shown in Table 15.2, which presents mean daily expenditures and direct benefits, in constant dollars, for hunting and non-hunting trips for Canada and the provinces. For Canada as a whole, the table shows that hunters and non-hunters spent, on average, less money per day in 1987 (columns 2 and 5) than in 1981 (columns 3 and 6). Based on the growth ratios computed in columns 4 and 7, average daily expenditures in 1987 were about 60–70% of those of 1981.

A slightly different picture emerges for direct benefits derived from hunting and non-hunting trips. Although average daily direct benefits were also lower in 1987 than in 1981, this difference is smaller than is the case for expenditures. According to growth ratios for Canada (columns 10 and 13), the average daily direct benefits in 1987 were 80–90% as large as those received by participants in 1981. In other words, direct benefits have kept pace with inflation more successfully than expenditures over the six-year period. Provincial results presented in the table follow a similar pattern.

15.3 Discussion

Between 1981 and 1987, the significant benefits derived from wildlife-related activities across Canada increased at a rate ranging from approximately 23% to 32%. At the same time, inflation grew at an overall rate of about 38%. If inflation is taken into account, we are led to the observation that there has been no real growth in the benefits derived from participation in wildlife-related activities over that period. This seems to be the case for direct benefits in general, and especially for those attributable to hunting, which have shown the greatest stability over time. Further, it is possible that there may have been an actual decline in benefits when measured in constant dollars over and

Table 15.1
Comparison of selected wildlife-related recreational benefits in current dollars for Canada, 1981 and 1987

		Indirect benefits			Direct benefits	
Year	Expenditures on wildlife-related activities ($ billion)	GDP ($ billion)	Personal income ($ billion)	Government revenue ($ billion)	Calendar year ($ billion)	Range of present values ($ billion)
1987	5.1	6.5	3.7	2.5	1.0	10–20
1981	4.2	5.2	3.0	1.9	0.8	8–16
% difference*	21.4	25.0	23.3	31.6	25.0	25.0

* % difference is calculated as follows: $\frac{(1987 \text{ result} - 1981 \text{ result})}{1981 \text{ result}} \times 100$.

[1] Jacquemot, A.; Reid, R.; Filion, F.L. 1986. The importance of wildlife to Canadians: The recreational economic significance of wildlife. Canadian Wildlife Service, Ottawa, Canada.

Table 15.2
Mean daily expenditures and direct benefits for hunting and non-hunting trips in 1987 compared with 1981 results, adjusted for inflation during 1981–87*

		Expenditures per day						Direct benefits per day					
		Hunting			Non-hunting			Hunting			Non-hunting		
	1	2	3	4	5	6	7	8	9	10	11	12	13
Province	CPI for 1987 (1981 = 100)	1987 mean $	1981 mean inflated to 1987 dollars	Growth ratio 1987/1981	1987 mean $	1981 mean inflated to 1987 dollars	Growth ratio 1987/1981	1987 mean $	1981 mean inflated to 1987 dollars	Growth ratio 1987/1981	1987 mean $	1981 mean inflated to 1987 dollars	Growth ratio 1987/1981
Newfoundland	135.2	26.2	36.9	0.7	27.9	57.7	0.5	13.0	14.3	0.9	6.3	8.4	0.8
Prince Edward Is.	131.5	22.4	22.9	1.0	18.0	25.7	0.7	15.4	15.2	1.0	6.4	5.2	1.2
Nova Scotia	135.5	21.2	47.2	0.4	20.4	52.0	0.4	12.1	13.8	0.9	7.3	8.8	0.8
New Brunswick	136.3	27.5	38.3	0.7	26.2	38.5	0.7	12.8	13.1	1.0	6.0	7.0	0.9
Quebec	139.8	35.5	37.2	1.0	27.7	37.7	0.7	11.3	10.1	1.1	5.3	5.7	0.9
Ontario	140.8	38.0	37.6	1.0	30.0	48.0	0.6	19.9	19.4	1.0	8.2	9.2	0.9
Manitoba	136.4	56.7	63.1	0.9	28.1	49.5	0.6	16.6	26.7	0.6	6.6	9.0	0.7
Saskatchewan	134.9	40.2	42.6	0.9	36.0	60.7	0.6	17.0	22.0	0.8	7.5	10.4	0.7
Alberta	133.1	44.7	95.0	0.5	37.5	57.2	0.7	19.1	27.9	0.7	7.9	10.9	0.7
British Columbia	132.5	50.3	101.8	0.5	31.3	72.6	0.4	17.3	26.7	0.6	7.9	11.0	0.7
Canada	138.2	37.0	50.8	0.7	30.0	50.8	0.6	15.8	17.9	0.9	7.2	8.8	0.8

* Column explanations:
(1): The Consumer Price Index (CPI) is a measure of inflation occurring since 1981 as per Statistics Canada publication No. 62.010.
(2): Actual daily mean value observed in 1987 survey. [Also columns 5, 8, and 11.]
(3): 1981 mean adjusted for inflation since 1981. This result is directly comparable with means observed in the 1987 survey in constant dollars. [Also columns 6, 9, and 12.]
(4): Ratio of column 2 to column 3. A ratio smaller than 1 reveals that 1987 expenditures have not grown with inflation since 1981. [Also columns 7, 10, and 13.]

above inflation. This seems to be the case for indirect benefits resulting from expenditures on both hunting and non-consumptive activities.

There are two main explanations that help shed light on this observation. On one hand, maintenance or potential growth of the expenditures of participants in wildlife-related activities may have been hampered by the economic climate of the country, which suffered a recession during that period; interest rates fluctuated considerably and attained historical highs; many regions of the country also experienced high unemployment rates; confirmation of general economic uncertainty is reflected in the stock market crash of October 1987. The issue is further compounded by the reality that Canada's population is aging, resulting in the fact that some participants in wildlife-related activities may have made their required purchases of equipment before 1987, whereas others may be showing a preference for more sedentary activities.

On the other hand, maintenance or potential growth of direct benefits enjoyed by participants in wildlife-related activities may have been hampered by apparent declines in the relative abundance of wildlife populations and the continued degradation of vital habitats. This lack of maintenance or growth in direct benefits may be linked to fiscal restraints leading to a scarcity of fresh investments in wildlife and habitat management programs during the period in question. Given the austerity of budgets in recent years, it is possible that government expenditures on wildlife conservation programs in many jurisdictions, when measured in constant dollars, may have actually decreased. However, there are indications that the situation may be changing. Major new initiatives like the North American Waterfowl Management Plan, the St. Lawrence Action Plan, and initiatives on long-range transport of airborne pollutants, among others, constitute examples of fresh efforts to reverse damage to vital ecosystems on which the survival of wildlife depends. Additional wildlife conservation initiatives are now being planned as part of new environmental agendas at federal and provincial levels.

Given the fact that survey results for 1981 and 1987 constitute only two points in time, it is not possible to conclude with certainty that the above observation is indicative of a meaningful trend. The socio-economic results from an important follow-up study expected to be conducted by Statistics Canada in February 1992 will be essential in clarifying the issue of potential declines in wildlife-related benefits over time.

16 Economic benefits of fish- and wildlife-related recreational activities

For the first time, the 1987 survey on The Importance of Wildlife to Canadians included questions about participation in recreational fishing. The results indicate that 5.6 million Canadians (28.1% of the population) took part in this activity during the year. When the economic benefits resulting from recreational fishing are combined with those resulting from the wildlife-related activities, a more comprehensive picture emerges. These combined economic benefits are summarized in Figure 16.1. It is important to note that these figures are underestimates inasmuch as they exclude commercial values of fish and wildlife resources as well as other sources of value, such as those mentioned in Chapter 17 of the report. The results on angling benefits are based on data obtained from Fisheries and Oceans Canada.[1] Although the data were collected for 1985, they have been indexed to 1987 dollars to correct for inflation during that period. The data on expenditures and direct benefits for angling are based on questions similar to those used for wildlife and described in Sections 3.1 and 4.1. Economic impacts and the present value for angling were estimated according to procedures and assumptions described in Sections 3.2 and 4.2.

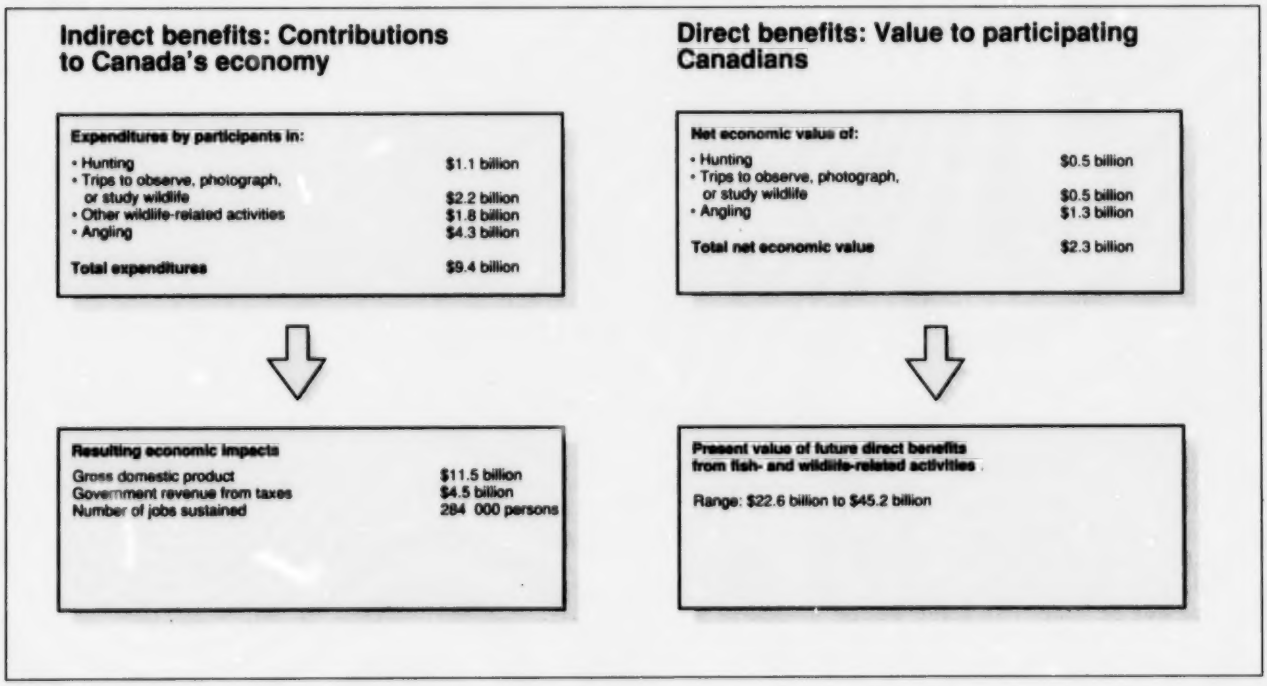
16.1 Indirect benefits: Contributions to Canada's economy

Figure 16.1 reveals that residents of Canada are estimated to have spent $9.4 billion in 1987 to participate in fish- and wildlife-related recreational activities. The economic impacts resulting from these expenditures are significant. They contributed $11.5 billion to the country's GDP and $4.5 billion in government revenue from taxes. They also sustained 284 000 jobs during 1987.

16.2 Direct benefits: Value to participating Canadians

Those who took part in fish- and wildlife-related activities derived significant net economic value from their participation. This net economic value was estimated to be worth $2.3 billion in 1987 (Fig. 16.1). Assuming that fish and wildlife management programs will be successful in conserving these living resources for sustained utilization, we have estimated the present value of the benefits that will result year after year in the future to range from $23 billion to $45 billion.

Figure 16.1
Economic benefits of fish- and wildlife-related recreational activities


Indirect benefits: Contributions to Canada's economy
Expenditures by participants in:
• Hunting $1.1 billion
• Trips to observe, photograph, or study wildlife $2.2 billion
• Other wildlife-related activities $1.8 billion
• Angling $4.3 billion
Total expenditures $9.4 billion
Resulting economic impacts
Gross domestic product $11.5 billion
Government revenue from taxes $4.5 billion
Number of jobs sustained 284 000 persons
Direct benefits: Value to participating Canadians
Net economic value of:
• Hunting $0.5 billion
• Trips to observe, photograph, or study wildlife $0.5 billion
• Angling $1.3 billion
Total net economic value $2.3 billion
Present value of future direct benefits from fish- and wildlife-related activities
Range: $22.6 billion to $45.2 billion

[1] Department of Fisheries and Oceans. 1988. Sport fishing in Canada, 1985. Ottawa, Canada.

17 Implications and conclusions

The Statistics Canada results from the 1987 National Survey on the Importance of Wildlife to Canadians confirm the magnitude of the benefits to ıe people and to the economy of Canada. Given this array of social and economic findings, one is naturally inclined to ask what conclusions and management implications might be drawn at this time. An examination of the mission statements of federal and provincial wildlife management agencies reveals universal agreement on a common objective. This common objective relates to the will of all jurisdictions to maintain and enhance wildlife for the benefit of present and future generations—an objective that is congruent with Canada's new wildlife policy and the concept of sustainable development. The Statistics Canada data base constitutes one of the most important sources of information available to government agencies on the benefits resulting from wildlife resources in Canada. These socio-economic findings are valuable to agencies in a number of ways, as outlined below.

17.1 The strategic role of socio-economic benefits in conservation

An important conclusion reached by the United Nations World Commission on Environment and Development was the following: "Species problems tend to be perceived largely in scientific and conservationist terms rather than as leading economic and resource concerns. Thus the issue lacks political clout."[1] In light of this observation, one of the principal roles of social and economic benefits is to enhance the level of importance that senior decision makers attach to wildlife and habitat conservation issues when compared with other competing priorities. Another instrumental role is the application of socio-economic insights to pressing wildlife management needs through the identification of priorities, issues, and solutions.

It is increasingly apparent that senior decision making and wildlife management processes benefit from a heightened awareness of socio-economic considerations in renewable resource management. This enhanced awareness is critical in:

- protecting biological diversity from degradation by demonstrating that the well-being of people, communities, and businesses is in jeopardy when wildlife populations and vital ecosystems are threatened by non-sustainable forms of development;
- ensuring that wildlife and habitat conservation concerns are integrated into planning and development processes in key sectors such as agriculture, forestry, tourism, water resources, and energy, which affect the well-being of people and the economy;
- justifying the financial investments in research and management that are needed for the preservation and sustainable use of wildlife and habitat resources at senior decision-making levels dealing with economic policy and development planning priorities;
- taking a proactive view toward wildlife conservation by advocating forms of development aimed at enhancing nature's tangible and quantifiable contributions to local and regional economies and to human welfare;
- designing economic, social, and institutional incentives in support of wildlife and habitat conservation priorities, and modifying policies and practices that may be counterproductive;
- contributing wildlife-related socio-economic indicators to new decision-making instruments such as the quinquennial State of the Environment reports, and to the creation of Environmental Satellite National Income Accounts; and
- ensuring that wildlife management programs enhance public benefits by evaluating regional management initiatives through the identification of changes in socio-economic values.

17.2 Conclusions

Some conservationists hold the opinion that Canada's wildlife populations are priceless. The findings in this report do not purport to take issue with that opinion. Rather than focusing on the value of wildlife populations themselves, the report has identified and estimated the significant benefits that result from ways in which these wildlife populations may be enjoyed and utilized in a sustained way by people. Some of these benefits are substantial. Fish- and wildlife-related recreational activities as a whole contributed $11.5 billion to Canada's gross domestic product and sustained 284 000 jobs during 1987. That year, the personal enjoyment provided to participants in fish- and wildlife-related activities was valued at more than $2 billion.

[1] United Nations World Commission on Environment and Development (Brundtland Commission). 1987. Our common future. Oxford, England.

The results provide a notable incentive for senior decision makers to rationalize further investments in conservation strategies, policies, and programs in light of the apparent declines in the relative abundance of wildlife populations and vital habitats. If these declines go unabated, they would be expected to impact on the magnitude of the wildlife-related benefits accruing to Canada's economy and its peoples, as suggested in Section 15.3.

The socio-economic benefits reported here challenge the myth that conservation initiatives are a financial burden on the shoulders of Canada's taxpayers. At present, federal and provincial governments spend less than $1 billion annually on fish and wildlife resource management programs.[2] As the results of Chapter 16 indicate, federal and provincial treasuries as a whole receive considerably more in tax revenues that can be linked with fish- and wildlife-related recreational activities than they currently spend on conserving these resources. More specifically, for each dollar spent on fish and wildlife conservation programs, it is estimated that more than $4.50 is returned to federal and provincial treasuries in tax revenues every year. In addition, through the estimation of direct benefits, decision makers can gauge how participants enjoyed engaging in wildlife-related activities. Because these millions of participants are the ones counted on to support wildlife management initiatives, changes in their levels of enjoyment, or changes in the magnitude of direct benefits, should be closely monitored to identify important shifts.

Despite the apparent magnitude of the benefits reported above, it is important to note that these findings underestimate actual benefits inasmuch as subsistence and commercial uses and wildlife-based international tourism to Canada have not been measured. Further, estimates of non-use benefits of wildlife should also be included. This would allow a comparison on equal footing of the full spectrum of the benefits of the services provided by wildlife resources to Canadians with industrial, agricultural, forestry, and other economic activities. A forthcoming Statistics Canada national survey scheduled for February 1992 will extend beyond the scope of the present survey to measure some of these additional sources of benefits to Canadians. In the meantime, a fourth and final report in the series on The Importance of Wildlife to Canadians will be produced. That report will be released in 1991 and will focus on emerging trends in participation in wildlife-related activities with a forecast in demand to the year 2006.

[2] Jacquemot, A.; Filion, F.L. 1989. Economic impacts of government expenditure on fish and wildlife management. 31st Annual Conference of the Western Social Science Association, Albuquerque, U.S.A.

Appendix A:
Definition of terms

Key economic and other terms used in this report are explained below. The definitions have been adapted specifically to the subject at hand and are presented in alphabetical order. Additional definitions of key terms pertaining to expenditures, activities, wildlife, etc., may be found in earlier reports in this series.[1] Terms that are in boldface type are defined in the appendix.

Annuity
An annuity is a sequence of equal payments made at equal intervals of time, such as monthly payments of rent or quarterly stock dividends. It is used here to explain the **capitalized value** or the **present value** of **direct benefits**.

Capitalized value
Capitalized value is the amount of capital that would have to be invested at an interest rate or **discount rate** of 5% or 10%, above and beyond inflation, to produce an amount of earnings year after year in perpetuity. When applied to **wildlife** resources, this means the total amount of money required to earn annual interest income in perpetuity, equal to the **net economic value** received by participants in **wildlife-related activities** during the 12-month period of 1987. When the number of years can be assumed to be infinite, the capitalization formula is as follows: $C = B/r$. Hence, the capitalized value C needed to produce $1.0 billion of **direct benefits** B received by participating Canadians year after year at a discount rate r of 10% is $10 billion. The discount rates chosen (5% and 10%) fall within the range recommended by the Treasury Board of Canada.

Consumer Price Index (CPI)
The Consumer Price Index is an indicator developed by Statistics Canada to measure the percentage change in prices due to inflation with respect to a base year taken as 100. The CPI for 1987 was 138.2, with 1981 equivalent to 100. When a comparison between these two years is made without consideration of the effect of inflation, the comparison is said to be based on *current dollars*. However, when the comparison takes into account the effect of inflation, it is said to be based on *constant dollars*—dollars that have been indexed to reflect changing values over time. Based on constant dollars, $1.38 was needed in 1987 to purchase a good that could have been purchased for $1.00 in 1981.

Consumptive activity
Consumptive activity is defined as an activity whose purpose is the harvesting of **wildlife**. In this report, it refers primarily to recreational hunting.

Direct benefits
Direct benefits are **net economic values** that people place on the utilization of a resource. In this study, indicators of direct benefits were obtained in response to the question, "How much value do people place on **wildlife-related activities**?" *See also* **Net economic value**.

Discount rate
Discount rate is the interest rate used to estimate the **present value** or the **capitalized value**. A real discount rate is a discount rate over and above the inflation rate.

Expenditures
Expenditures are defined as expenses incurred by the participant for the purchase of goods and services to be used *primarily* for participation in **wildlife-related activities**. Goods bought for other purposes but used in wildlife-related activities are not considered to be legitimate costs of wildlife activities. Expenditures are needed to estimate **indirect benefits** to the economies of Canada and the provinces but cannot be used as a measure of **net economic value** to participants (see Fig. 2.1, C and D).

Government revenue from taxes
The national figure includes all federal, provincial, and local taxes, both direct and indirect, net of subsidies, levied on business and personal income earned and various goods and services. The provincial figures include all the direct and indirect taxes, net of subsidies, levied by the provincial and local governments resulting from the economic stimulus generated by money spent to participate in **wildlife-related activities**. By definition, the national figure is larger than the sum of provincial government revenues.

Gross business production
Gross business production measures the overall business activity within Canada or the provinces generated by **expenditures**. It includes the total value of both final and intermediate goods and services produced in the business sector.

[1] Useful publications include the following: (1) Filion, F.L.; DuWors, E.; Jacquemot, A.; Bouchard, P.; Boxall, P.; Gray, P.A.; Reid, R. 1989. The importance of wildlife to Canadians in 1987: Highlights of a national survey. Canadian Wildlife Service, Environment Canada, Ottawa, Canada; (2) Yiptong, J.; DuWors, E. 1990. The importance of wildlife to Canadians: A user's guide to the methodology of a national survey. Canadian Wildlife Service, Environment Canada, Ottawa, Canada; and (3) Jacquemot, A.; Reid, R.; Filion, F.L. 1986. The importance of wildlife to Canadians: The recreational economic significance of wildlife. Canadian Wildlife Service, Environment Canada, Ottawa, Canada.

Gross domestic product (GDP)
Gross domestic product measures the total value, at market prices, of production of final goods and services within Canada or the provinces, resulting from the **expenditures** of participants in **wildlife-related activities**. All duplications such as intermediate expenses are eliminated. It is one of the most widely used measures of economic performance, along with the conceptually similar economic indicator, gross national product (GNP). The GDP of Canada as a whole amounted to $550 billion in 1987, whereas the GNP amounted to $534 billion.

Indirect benefits
Indirect benefits are indicators of the economic activity generated by the use of a resource. In this study, indicators of indirect benefits were obtained in response to the question, "What are the economic impacts that result from participation in **wildlife-related activities**?" All economic effects on the national or provincial economy resulting from **expenditures** of participants in wildlife-related recreational activities in 1987 are based on input–output analyses by Statistics Canada and are measured in terms of **gross business production, gross domestic product (GDP), government revenue from taxes, number of jobs** sustained, and **personal income** (see Fig. 2.1, E).

Input–output models
The latest input–output models developed and maintained by the Structural Analysis Division of Statistics Canada were employed. The National Input–Output Model was used to analyze the propagation of demand throughout the Canadian economy, which is disaggregated into many sectors. The Interprovincial Input–Output Model complemented the national model by providing a provincial dimension to the industry and commodity accounts. The accounting framework of these models is the most detailed set of input–output accounts for Canada, including approximately 200 industries, 600 commodities, and 140 final demand categories. The models are documented in the *User's guide to Statistics Canada structural economic model* (1980, Statistics Canada).

Large mammals
Large mammals is defined as big game and non-game species, such as deer, bears, moose, mountain sheep, etc.

Natural area
Natural area is defined to include areas such as a woodlot, hedge, marsh, open field, or similar natural area that provides food or shelter for **wildlife**.

Net economic value
Net economic value is the value of the enjoyment received by participants in **wildlife-related activities** net of the **expenditures** associated with these recreational activities. Since little or no information readily exists on the value of these activities, the value was estimated by asking participants about their willingness to pay for wildlife-related recreation. The resulting dollar amounts reflect wildlife-related benefits that occur outside the marketplace but that are comparable with the price of other goods and services bought and sold in the marketplace. Net economic value is equivalent to **direct benefit** in this report and in reports published on the results of the 1981 national survey (see Fig. 2.1, C).

Non-consumptive activity
Non-consumptive activity is defined as an activity that does not involve the harvesting of **wildlife**, such as observing, feeding, photographing, or studying wildlife. Non-consumptive activities include residential activities, **primary non-consumptive trips** or outings, and incidental wildlife encounters during other trips or outings.

Number of jobs
This represents the number of jobs in various businesses and industries sustained as a result of **expenditures** by participants in **wildlife-related activities** in 1987. This does not necessarily reflect full-time jobs.

Other birds
Other birds is defined as wild birds other than **waterfowl**; for example, robins, sparrows, crows, pigeons, hawks, and owls, as well as upland game birds such as grouse, partridge, pheasant, etc.

Other wildlife
Other wildlife is defined as **wildlife** other than **waterfowl, other birds, small mammals** and **large mammals**; for example, butterflies, frogs, snakes, lizards, etc.

Personal income
Personal income is the component of **gross domestic product** that represents the sum of all incomes received by residents of Canada.

Present value
Present value is the sum of future **direct benefits** discounted at a given interest rate. *See also* **Capitalized value**.

Primary non-consumptive trip
Primary non-consumptive trip or outing is defined as a trip or outing taken for the primary purpose of encountering **wildlife** to watch, feed, photograph, or study them.

Small mammals
Small mammals is defined as small game and non-game species, such as rabbits, squirrels, raccoons, foxes, groundhogs, beaver, other furbearers, etc.

Sustainable development
Sustainable development as it pertains to **wildlife** conservation means the utilization of wildlife and the ecosystems on which wildlife depends to optimize economic and other societal benefits today while not damaging prospects for their use by future generations. This definition is consistent with the concept elaborated by the United Nations World Commission on Environment and Development in 1987 and endorsed by Canada's National Task Force on Environment and the Economy in 1987.

Total willingness to pay
The total willingness to pay for the enjoyment provided by **wildlife** every year (see Fig. 2.1, B) represents the total amount of economic benefit or gross economic value received by participants in **wildlife-related activities**. It is measured by the sum total of the actual **expenditures** incurred to participate in wildlife-related activities (see Fig. 2.1, D) and a **net economic value**, or the willingness to pay over and above these expenditures for the enjoyment provided by wildlife-related activities (see Fig. 2.1, C).

Waterfowl
Waterfowl is defined as ducks, geese, herons, cranes, etc.

Wildlife
Wildlife is defined as wild animals, not pets or other domesticated animals. It includes **waterfowl**, **other birds**, **small** and **large mammals**, and **other wildlife** in a natural environment. Animals in zoos or game farms were not classified as wildlife in this study.

Wildlife-related activities
Wildlife-related activities is defined as recreational activities that include, in some form, either direct or indirect contact with **wildlife**. All **consumptive** and **non-consumptive activities** are included in this category.

Federal and provincial survey sponsors

Mr. R. Andrews
Director of Wildlife
Fish and Wildlife Division
Department of Forestry, Lands and Wildlife
Edmonton, Alberta

Monsieur J. Cinq-Mars
Directeur régional
Région du Québec
Service canadien de la faune
Sainte-Foy, Québec

Mr. H.A. Clarke
Director General
Canadian Wildlife Service
Ottawa, Ontario

Mr. R.W. Crowley
Director General
Economic and Commercial Analysis Directorate
Department of Fisheries and Oceans
Ottawa, Ontario

Mr. S.G. Curtis
Regional Director
Ontario Region
Canadian Wildlife Service
Ottawa, Ontario

Dr. G. Finney
Regional Director
Atlantic Region
Canadian Wildlife Service
Sackville, New Brunswick

Mr. J. Hancock
Acting Director
Wildlife Division
Department of Environment and Lands
St. John's, Newfoundland

Mr. A. Hoole
Director
Wildlife Branch
Department of Natural Resources
Winnipeg, Manitoba

Mr. N. Jotham
Humane Trapping Program Coordinator
Canadian Wildlife Service
Ottawa, Ontario

Mr. J.A. Keith
Director
Wildlife Toxicology and Surveys Branch
Canadian Wildlife Service
Ottawa, Ontario

Mr. G.R. Kerr
Regional Director
Western and Northern Region
Canadian Wildlife Service
Ottawa, Ontario

Mr. J. MacLean
Director
Wildlife Branch
Ministry of Natural Resources
Toronto, Ontario

Dr. A. Martell
Regional Director
Pacific and Yukon Region
Canadian Wildlife Service
Delta, British Columbia

Mr. B.B. Meadows
Executive Director
Fish and Wildlife Branch
Department of Natural Resources and Energy
Fredericton, New Brunswick

Mr. D.K. Pollock
Director
Program Analysis and Coordination
Canadian Wildlife Service
Ottawa, Ontario

Mr. M.H. Prime
Director
Wildlife Division
Department of Lands and Forests
Kentville, Nova Scotia

Mr. D. Sherratt
Director
Wildlife Branch
Saskatchewan Parks, Recreation and Culture
Regina, Saskatchewan

Mr. A. Smith
Director
Fish and Wildlife Division
Department of the Environment
Charlottetown, Prince Edward Island

Monsieur D. St-Onge
Directeur
Direction de la gestion des espèces et des habitats
Ministère du Loisir, de la Chasse et de la Pêche
Québec, Québec

Mr. G. Thompson
Director
Migratory Birds and Wildlife Conservation Branch
Canadian Wildlife Service
Ottawa, Ontario

Mr. J. Walker
Director
Wildlife Branch
Ministry of Environment
Victoria, British Columbia